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Measurement of Joint Motion: Part I—
MOORE

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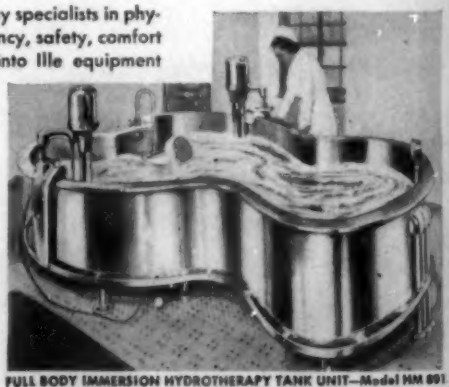

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The Measurement of Joint Motion*

Part I—Introductory Review of the Literature

Margaret Lee Moore, M.S., R.P.T.

(*Editor's Note:* This is one of a series of three papers. The second will be a technic of goniometry based on a practical application of principles discussed in the review of the literature. The third is a statistical study of the reliability of the technic proposed.)

Survey of the Literature

Goniometry, or the use of instruments for measuring the range of motion in joints of the body, has been discussed in the English and American literature since the turn of the century. The medical needs of both World Wars brought about periods of intensive use of goniometry. Through records derived by measuring the residual motion present in diseased or traumatized joints of the body, valuable information was accumulated. This information was useful to the physician, the therapist treating the patient and to the patients themselves. The data obtained on each patient during the course of treatment gave the physician a progress study of the man under his care. To the physical therapist it not only served as a progress study but was a constant reminder of the effectiveness of the treatment he was administering. These records aided in securing and maintaining patient interest and in further stimulating the desire to improve.

The goal of this study was to establish the degree of reliability of certain phases of the actual application of the clinical measurement. The initial step toward this goal was to examine critically the existing literature in this field. By doing this a set of *a priori* principles and a defensible technic was set up. An experimental study based on this technic and analyzed statistically was made.

The literature was extensive. It covered many and varied aspects of goniometric measuring. A variety of instruments were described and recommended. Record forms were abundant and dissimilar. The most confusing element was the interpretation of the obtained measurements. Modes of expression and numerical values were such that interpretation of the data not only was difficult but extremely discouraging and disturbing to the reader. The description of the body positions from which measurements originated, the joint motions obtained and the numerical values accorded each joint position were the primary contributors to this conflict. There has been only one previous attempt to survey this field. A brief review of the existing literature was made by Wiechec and Krusen in 1939.[1]

Instrumentation

The instruments described for use in obtaining joint range of motion measurements were many in number. However, they fall into two general classifications. The first is the tool of universal application. It can be used for obtaining measurements on all joints of the body. Basically it is a protractor, at the center of which two long slender arms or projections are attached. One or both of these arms

*This work was done in the Division of Clinical Research, Baruch Center of Physical Medicine, Medical College of Virginia, in partial fulfillment for the M.S. in Physical Therapy. The author is now affiliated with the Department of Physical Medicine, University of Colorado Medical Center, 4200 East 9th Avenue, Denver, Colorado.

may be movable in order that they can be placed parallel to the anatomical lever arms of the articulations of the body. The center of the protractor is then located over the joint axis of motion. The arc of motion in degrees is read from the protractor at the point where the moving arm bisects it. The origin of this device is unknown.

The second classification of instruments covers all tools which were designed to measure a single range of motion for a specific joint. These usually attempt to fit the contour of the contiguous anatomical parts or are applied to the lateral surface of the joint. They are more complicated in design than the universal instrument. An article by Gifford in 1914 described four such instruments for the ankle, elbow, wrist and radio-ulnar joints respectively. This appears to be the first article in the American and English medical literature of the twentieth century dealing with goniometric devices. Many special type instruments subsequently described appeared to be based on French devices in use during the First World War. These were well illustrated by Fox in 1917,[2] who stated that they were copied from devices designed by Amar and Camus in France.

A. The Universal Goniometer

1. *Double Armed Instrument*—The most frequently recommended design for the universal goniometer specifies that it have two movable arms. Wakely,[3] Conwell,[4] Molander[5] and Cave and Roberts[6] all recommended such a tool. Robinson[7] specified, in addition, that the arms of the instrument should be hinged. Thus, the tool could fold up and fit into a handy carrying case. Rosen[8] approved of the universal device for some joints but specified that other instruments could be used more accurately for the shoulder, hip and finger joint measurements. They will be referred to in a later section. The tool developed by Parker[9] was the same as the above in principle. It had detachable paper dials which fit over the protractor for instantaneous recording of measurements. Knapp and West[10] recommended the use of the Lufkin carpenter's rule as a joint measuring device. This rule is essentially the same as the double armed goniometer but, in addition, is provided with levels by which the accuracy of placement is assisted. It might well be more widespread in its use today and its reliability should be further investigated. Among the most recent references to the clinical application of goniometry are the Army Air Forces Manual[11] and Snedecor.[12] Neither describe the instrument to be used but appear to refer to the universal goniometer under discussion.

2. *Stand Supported Instrument*—Silver[13] was one of the first to suggest that an adjustable stand be added to the universal goniometer. This could support the instrument independently of any assistance by the operator. It also could be adjusted in height in order more accurately to place the center of the protractor in line with the axis of the joint under observation. Coulter and Molander[14] and Wiechec and Krusen[1] both used such a tool. Specifications for a stand supported goniometer were prepared by the Council on Physical Medicine of the American Medical Association and made available to the profession. It is not in general clinical use at present because it is inconveniently heavy and somewhat difficult to handle. Wilson and Stasch[15] developed a similar instrument which will be discussed in a later section due to the variation in the use to which it was put.

3. *One Movable Arm and Two Stationary Armed Goniometer*—The use of two stationary arms on the base of a goniometer makes it possible to measure the joints on the right and left side of the body with equal ease. It also gives a long line for sighting in placing the device. This can be of great assistance in measuring joints characterized by long anatomical lever arms. Ashhurst[16] and Hellebrandt and Miles[17] used such a goniometer. The latter was constructed from a transparent plastic material by Hellebrandt and Elkins at the Mayo Clinic (Fig. 1). The original design is credited to Elkins. Hence, this device is referred to as the Elkins goniometer. A similar instrument made entirely of a transparent plastic protractor mounted on a light aluminum base is now used in the Division of Clinical Physical Medicine of the Medical College of Virginia Hospitals.

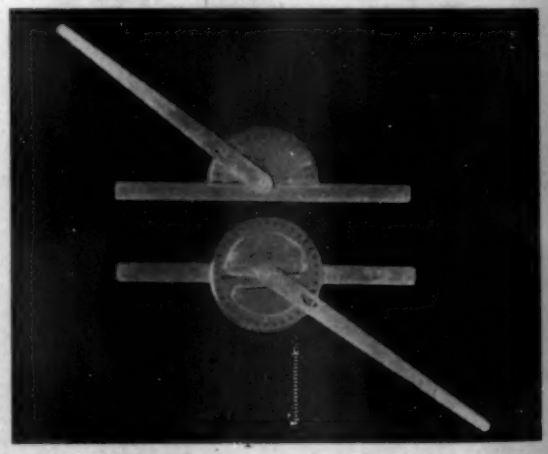


Figure 1. A desirable type of double armed universal goniometer with a half circle protractor. Modifications of the Elkins device.

B. *Measuring Devices Adapted to Specific Joints*

As stated previously Fox[2] was the only one of the early writers on goniometry to state that the instruments he described were based on original French designs. Many of the goniometers described since that time bear a marked resemblance to these tools. A careful search of the literature failed to locate illustrations of the original French tools which appear to have been the source of widespread inspiration. Fox also published a photograph of Amar's "arthro-dynamometer." This instrument was similar to a universal goniometer. However it had an auxiliary device which indicated work done in foot pounds as the motion was executed. There is no evidence that this dual-purpose instrument was used by either British or American investigators. It is one of many practical testing and treatment tools developed by Amar for the French program of postwar rehabilitation. The goniometers described by Gifford[18] also seem to be similar to the French instruments, although they were more crudely made and antedated the war.

Fox illustrated an instrument for measuring pronation and supination of the radio-ulnar joints. It consists of a platform for supporting the forearm. A hand grip is attached to a pointed indicator which rotates in front of a fixed protractor as movement occurs in the joints under study. When the hand grip is turned it indicates on the superimposed protractor the range of movement in degrees.

Fox's device for the knee joint is equipped with two curved and padded supports which fit the anterior contour of the distal thigh and proximal leg. Both supports are strapped onto the part. The uniting brace is hinged at the knee joint and attached to a protractor at this point. The center of the protractor is then localized over the axis of the knee joint. The goniometer described by Fox was similar to the knee joint device but the padded supports were strapped on the inner surface of the arm and forearm instead of on the extensor surface. Fox's "fleximeter" for the measurement of the motion possible in the finger joints consists of a small protractor mounted on a short stationary arm which can be placed on the dorsal surface of the hand. The short movable arm, which is extended beyond the pivot as a pointer moving on the calibrated surface of the protractor, is held in contact with the proximal phalanx of the digit being studied. The goniometer for the ankle consists of two flat supports which are placed beneath the foot and on the posterior surface of the distal leg respectively. The axis of motion does not fall over the joint in which movement occurs but at the junction of the supports.

The only joints omitted in this instrument coverage were the hip, shoulder and wrist. Albee and Gilliand[19] described several instruments similar to those of Fox. However, they included a means of measuring shoulder and hip motions. The latter device, which was used for both joints, consists of a large half circle protractor hung on the wall and adjustable as to height. For measuring movements occurring at the shoulder joint the patient stands with the axis of the shoulder joint approximately at the center of the protractor. Motion is measured as the patient performs voluntary movements superimposed over the protractor scale. A similar procedure is carried out for the estimation of hip joint movements. An apparatus for wrist meaurements was described by Albee and Gilliand. Measurements of this joint were not considered by Fox. A large half circle protractor in the form of a paddle is attached at a right angle to a flat arm rest. The patient's hand is placed on a wooden guide hinged to the flat surface of the protractor. The forearm is strapped to the arm rest. For adduction and abduction measurements the hand is strapped with the palmar surface in contact with the wooden guide and the forearm is held in pronation. Another movable attachment is substituted for the measurement of flexion and extension. The forearm is now held midway between pronation and supination with the thumb of the hand directed superiorly.

The many other instruments illustrated or described in the literature are essentially of the same design.

The six instruments (Fig. 2) described in an instruction manual released by the Office of the Surgeon General, U. S. Army,[20] are strikingly similar to the goniometers originally described in 1917. The detailed specifications included make possible the construction of accurate tools. A new type of goniometer, compact and simple in design, was described for the estimation of hip and shoulder joint motions. A weighted pendulum indicator is suspended at the axis of a five inch double or full circle protractor (Fig. 2-A). This in turn is fixed perpendicular to a small flat wooden platform ten inches long and four inches wide. The flat surface of the platform is placed on the anterior aspect of the arm for the measurement of joint flexion. As voluntary motion occurs the weighted indicator acts as a plumb bob and signifies the degrees of motion. Other measurements are taken similarly.

The literature contains a discussion of other interesting devices for specific joint application. Clark's[21] device for pronation and supination is similar in general plan to the radio-ulnar goniometer illustrated by Fox. Patrick[22] devised a small drum goniometer equipped with a weighted indi-

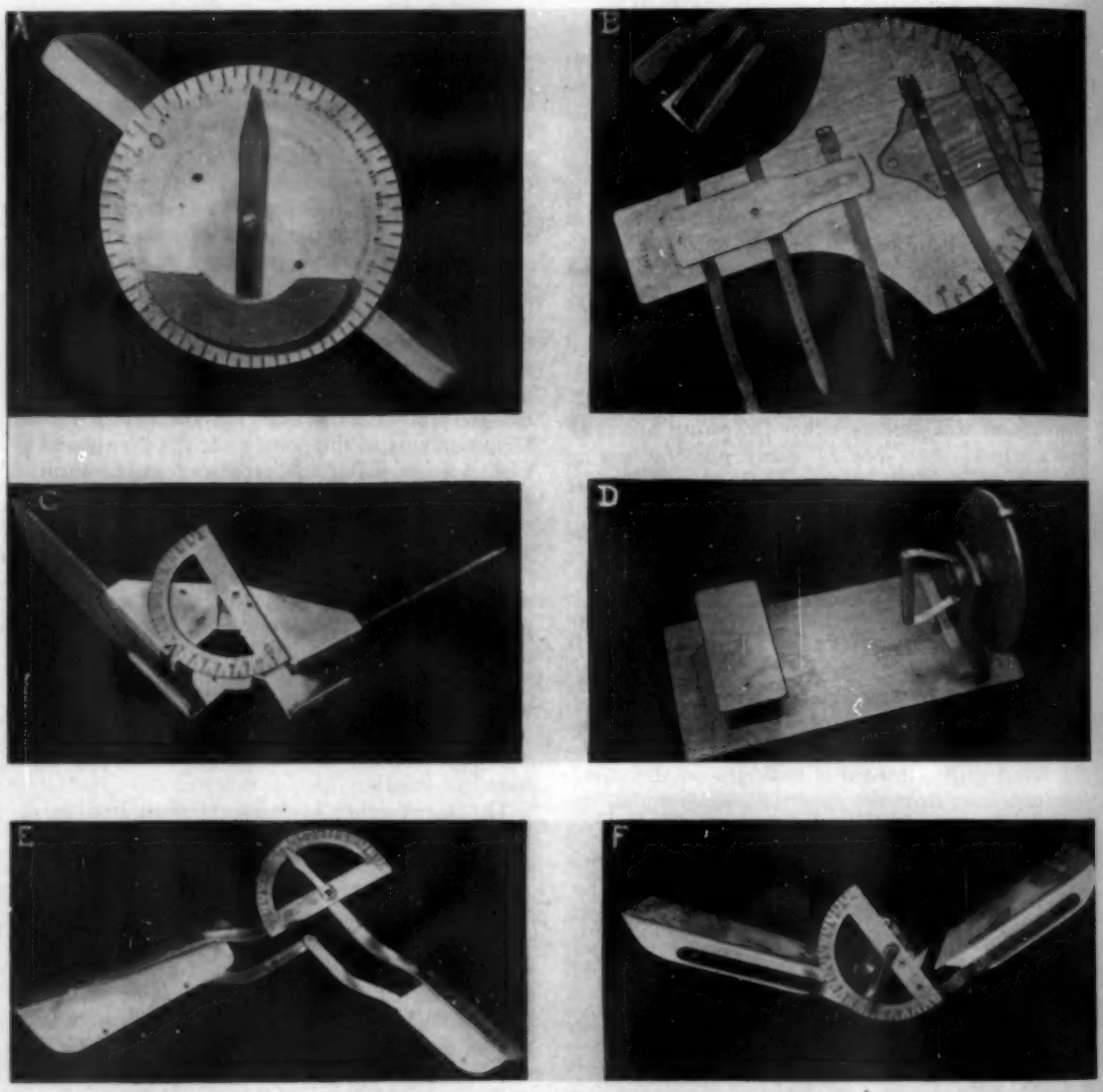


Figure 2. (A) Goniometer for the determination of hip and shoulder joint motion. (B) Goniometer for the determination of wrist abduction and adduction. The hand rest may be replaced by the device illustrated in the upper left hand corner of the photograph. The instrument may then be used for the measurement of the range of wrist joint flexion and extension. (C) Device for measuring elbow joint motion. (D) Instrument for measuring pronation and supination at the radio-ulnar joints. (E) Device for measuring knee joint motion. (F) Goniometer for determining flexion and extension at the ankle joint.

cating pendulum. A hand grip is attached to the periphery of a drum calibrated in degrees. This is seized and turned by pronating and supinating the forearm. The indicating pendulum remains vertical while the drum rotates. Rosen's[8] chart for sighting hip and shoulder measurements is the same in principle as the suspended protractor of Albee and Gilliand already described.

Hewitt[23] and Cobe[24] carried out a series of experiments on the range of movement in the wrist of normal men and women. The measurements of joint motion were taken on a goniometric arrangement quite similar to the paddle device described by Albee and Gilliand.[19] The main difference was that the instrument was built on a special table adjustable in height.

Technics of Special Interest: Nutter[25A] traced contour lines of fingers to be measured. He marked

the point of maximum motion in each direction on this tracing. Later he would calculate the range of motion present from the tracing lines of the original drawing. These were then used as permanent records.

Using the same tracing principle Rosen[8] designed a small platform on which to place the finger for the tracings. It consisted of a small circular platform on which the lateral aspect of the finger rested and a metal support to brace the metacarpal region during the execution of the finger motion.

By using a more elaborate spring balance arrangement Pollock and Brooks[26] designed an instrument for measuring finger joint motion. This is, in effect, a spring ergograph. It does not record the work done but permits a simultaneous estimate of the range of motion during movement against resistance.

Ghormley[27] devised a complicated apparatus for measuring the range of motion in the hip joint. The details of design are too involved to summarize in this study. The unique feature of the Ghormley "arthrometer" is its ability to measure the motion in all three anatomical planes simultaneously.

Wilson and Stasch[15] took double exposure photographs of the movement of the joints to be measured. The film was first exposed during the maximum motion in one direction and then during the maximum motion in the opposite direction. The range of motion was calculated on the print of the doubly exposed negative.

There are several commercial goniometers available at present. In general they are of universal design. These instruments are well constructed and their protractors are easily read.

METHODS OF RECORDING JOINT RANGE OF MOTION

Clinics have varied record forms for goniometric measurements. The most usual types are anatomical sketches of joints, charts for listing numerical values, and graphs for plotting the ranges of motion. The purpose of a record form is to make available to others the numerical values obtained by measuring. This recording should be clear, simple and understandable to all who may refer to it. Anatomical sketches with superimposed protractor scales have this advantage. They show at a glance the end points of measurement as they are related to the full range of motion. There need be no misinterpretation due to modes of expression or variable systems of numerical calculation. Cleveland[28], Molander and Weinmann[29] and the Division of Clinical Physical Medicine of the Medical College of Virginia[30] use such diagrams. Nutter[25a] used stylized stick figures and schematic diagrams for the larger joints. For the finger he relied on tracing the motion present. Rosen[8] and Gottlieb[30] also used tracings and/or sketches of the joints under investigation for recording measurements of range of motion. This system is conveniently applicable only to the small joints of the hand.

The Army Air Forces,[11] Hewitt,[23] and Snedecor[12] placed their numerical measurements on prepared charts. These are difficult to interpret unless one is completely familiar with the system of numerical expression in use. Few published charts contain enough information to be self-explanatory.

Another record form which frequently has this same disadvantage is the graph. It is true that progress and retrogression can be shown clearly but the absolute figures are difficult to interpret. Albee and Gilliand,[10] Ghormley[27] and Molander all used graphs. The photographic method employed by Wilson and Stasch [15] to which there has been previous reference, was excellent, but may be too expensive and time-consuming for routine clinical use. Observational errors are magnified because the measurements are made on reproductions significantly smaller than life size. Since the true axis of motion can neither be identified in the initial nor final position of the moving parts, the geometric angle of motion remains an approximation.

NOMENCLATURE

The majority of authors use the standard nomenclature of joints and motions as set up in the BNA (Basel Nomina Anatomica) listings.[31] These are well described also in *Morris' Human Anatomy*.[32] The minority who do not use these terms add to general misunderstanding. One of the most confusing features of goniometry is the manner in which standard terms are used. Expressions such as "lack of extension," "permanent flexion," and "flexion to 80°" are examples of terms so easily misunderstood and misinterpreted. The use of anatomical drawings as recommended previously will reduce this conflict.

For the shoulder and hip joints the terms flexion, extension, abduction, adduction, medial and lateral rotation are recommended. Expressions such as "forward elevation,"[28] "hyperextension,"[17] "side elevations,"[1] and "internal angle of the axilla"[3] are to be avoided.

There is little controversy relative to the nomenclature used to designate motions of the elbow or knee joints. Generally flexion and extension are correctly used. Conwell[4] postulates that motion of the elbow begins with the forearm perpendicular to the arm or at a right angle. To decrease that angle is to flex and to increase that angle is to extend the moving segment. He proposed the same plan for the knee. Pronation and supination are correct terms for motion at the radio-ulnar joints. Flexion, extension, abduction or radial flexion and adduc-

tion or ulnar flexion are standard terms for motion of the wrist joint. Other expressions employed are "volar flexion," "palmar flexion," "dorsal flexion" and "hyperextension." These probably were introduced as terms more descriptive for particular situations. The confusion that results, unless adequate defining is included each time, outweighs the advantage of the more specific term. For this reason it is recommended that universally understood nomenclature be used consistently.

The metacarpophalangeal joints are capable of motion in directions of flexion, extension, abduction and adduction. The motions of the interphalangeal joints are flexion and extension.

The ankle, as the wrist, is a source of conflict in nomenclature used for expressing directions of motion. Flexion and extension are recommended as standard. Dorsal flexion, dorsiflexion and plantar flexion are widely used and add some confusion. Cave and Roberts[6] and Conwell[4] describe the two motions as beginning in the anatomical position of the ankle. This position is with the foot flat on the floor or at a right angle to the leg. In this case flexion is the action that decreases this angle and extension would increase the angle of the foot with the leg.

Inversion and eversion are standard terms for the motion occurring at the transverse tarsal joint. However, Coulter and Molander[14] and Snedecor[12] speak of combinations of movements only as abduction and eversion, as well as adduction and inversion. Wiechec and Krusen[1] probably expressed the views of many when they asserted that these movements cannot be accurately recognized except in combination for they rarely occur alone.

NUMERICAL EXPRESSION OF JOINT MOTION

There are three basic systems of numerically expressing the values obtained in measuring joint motion. However, for each system advocated there are exceptions and variations too numerous to describe. The three basic systems are dissimilar enough to make interchange of values impracticable. Without a beforehand explanation it often is impossible to interpret the numerical values found written in progress notes or in hospital records. Since there is no universally accepted system the controversy between advocates of the three systems probably will continue. The use of anatomical diagrams with superimposed numerical scales for recording explains at a glance the values obtained by measuring and thus automatically resolves all conflict.

A. System of a Full Circle

Ashhurst,[16] Molander,[5] and Knapp and West[10] proposed that the basic motions of the joints be described on a full circle of 360 degrees in a sagittal plane. Flexion would be the motion approaching 0° and extension would be the motion approaching 360°. West[33] feels that this system has fewer exceptions than any other method. When properly used it eliminates the use of confusing expressions such as "return to neutral" and "hyperextension." The main objection to such a system is the difficulty of interpreting large figures such as "extension was 250°." A smaller figure of 70° would seem to be easier to understand in this instance.

B. System of Geometric 180° Arc

This second method apparently is based on the geometric law that 180 is the true expression of a half circle and the sum of two right angles. This is comparable to complete extension in all joints of the body.[35] As such, flexion is approaching 0° and extension is approaching 180°. Motion beginning from an anatomical position usually commences at 180°. As motion occurs the numerical value decreases, and progressive mobilization of a restricted joint yields a smaller and smaller number.

C. Anatomical Position of 0° of Motion

The third system is based on accepting the erect anatomical position as 0°. The anatomical position of the ankles is at a right angle of the foot to the leg and not in extension of the foot to the leg as in the previous system.

Measurements in each arc logically begin at 0° and progress toward 180°. Thus, as motion occurs the numerical expression of the amount of movement is positively recorded. As a joint with restricted extension improves, the numerical expression of position decreases. Silver[13] and Hellebrandt and Miles[17] were among those that used this system of small logical numerical values.

The only exception is the numerical expression of the magnitude of pronation and supination. For convenience, the midposition of the two movements is selected as a starting position. Motion increases from 0° to 90° and often more, in both directions from this starting position.

D. Miscellaneous Methods

Cleveland[28] and Albee and Gilliand[19] mark the limits of motion at both ends of the arc and express only the range of motion between them. They do not give a numerical value to either of the two end positions. This is open to criticism since it is impossible to visualize the existing motion in the movement pattern without a diagram.

Bunnell[34] describes a unique method for measuring finger motion. The patient is asked to make a fist. The distance from the tip of the finger to the palm of the hand is then measured. As the dis-

ability lessens this distance decreases. To measure finger extension he projects the longitudinal axis of the metacarpals beyond the metacarpophalangeal joints. The distance from the reference line to the tip of the finger, as it fails to extend fully, is measured with a ruler. As finger extension increases this measurement grows progressively smaller.

Charts have been drawn up for ready comparison of the various systems of numerical expression (Figs. 3-5). The arc within which motion takes place is labelled for all systems. It is shown on the left hand sketch of each chart. A hypothetical case with restricted motion is calculated by each system and illustrated in the right hand sketch of each chart.

Neutral Position and Starting Position

The initial step in the technic of goniometry is to ask the patient to assume a specific body position. This is called a preferred starting position. If carefully selected these positions make it less difficult to isolate the desired arc of motion to be measured. The instrument can be more accurately placed and its position maintained since the patient's position is less likely to deviate. The addition of motions in the same and adjacent joints other than the requested motion is recognized more readily.

The term neutral position also appears in the literature on goniometry. It may mean the starting position, or it may be only a point of reference selected by a single author to satisfy his needs of explanation. When used synonymously the two terms lead to confusion and misunderstanding.

West,[33] Hellebrandt and Miles,[17] Ashhurst,[16] and the Army of the United States, Medical Department[11] used the anatomical position for reference and description and then gave specific starting positions for each range of motion in individual joints to be measured. In this system there is no place for an overlapping of terms. Cave and Roberts[6] did not refer to the anatomical position but they did give a well defined description of the starting position they preferred for each joint and range of motion under consideration.

Clark[35] found it necessary to define only the starting position for shoulder and hip rotation and pronation and supination of the radio-ulnar joints. All other starting positions were taken with the joints in complete extension. Snedecor[12] required that the patient be standing for measurements of the upper extremity and lying for measurements of the lower extremity. Fox[2] only stipulated that the same position be used when repeating measurements. Cleveland[28] and Rosen[8] were but two of many who made no suggestions or set up no standard positions. Still others too numerous to mention gave inadequately sketchy descriptions or directions.

It is well to use the anatomical position as a point of reference for the discussion of the technic of goniometry. It is universally understood, standard nomenclature. However, it is extremely valuable to give clearly and specifically the preferred starting position for the measurement of every movement. This should include the exact position of all anatomical parts that may participate in or influence indirectly the movement to be measured. By so doing standardization of procedure is approximated and both intra-individual and inter-operator variances are reduced.

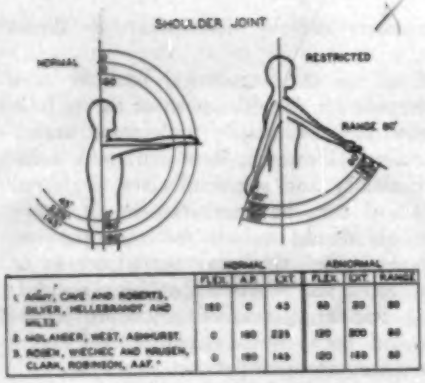
Axis of Motion

The extremities of the body are levers or systems of levers. The axis about which lever arms move is called the fulcrum. The location of the axis or fulcrum is an important consideration in the technic of goniometry. Conwell,[4] West[33] and Hellebrandt and Miles[17] specified that the fulcrum of the goniometer be placed at designated landmarks which approximate the axis of movement of the joint under study. West[33] named these locations in the technic of goniometry which she outlined. She called this arbitrary spot the "center of the joint." Among the locations she specified are the acromion process of the shoulder, the ulnar styloid of the wrist and the greater trochanter of the hip. Hellebrandt and Miles[17] instructed the operator to manipulate the joint to be measured in order to locate the "approximate axis." Meticulous inspection during the preliminary passive or active mobilization of the joint under study increases the accuracy of the localization of the axis of movement irrespective of abnormalities in the configuration of the part. The fulcrum of the goniometer is then placed over this point.

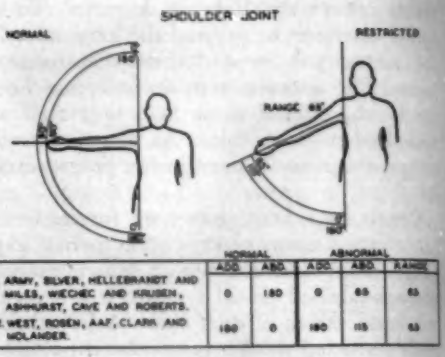
The axis position is not always so specifically designated in the technics described in the literature, nor is it consistently called the "axis of motion" though there can be little doubt that this is the point to which reference is made. Albee and Gilliand[19] used the term the "center of rotation." Cobe[24] spoke of the "axis of rotation." Robinson[7] did not designate particular locations but he explained that the joint axis is at a right angle to the axis of the limb under observation. Rosen[8] selected the name "pivotal point of the joint" even though he offered no specific explanation for its location.

Placement of the Goniometer

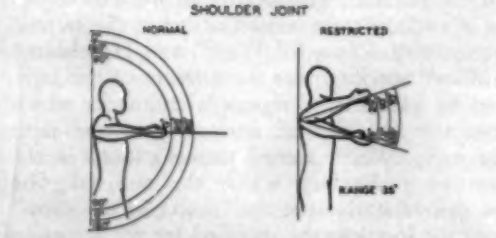
The literature includes extensive discussion of the placement of the measuring tool. However, few have recognized the importance of specific directions for placement of the goniometer. Without



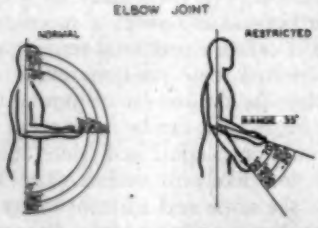
	NORMAL			ABNORMAL		
	FLEX.	A.P.	EXT.	FLEX.	EXT.	RANGE
1. ARMY, CAVE AND ROBERTS, SILVER, HELLEBRANDT AND MILES.	180	0	45	80	20	80
2. MOLANDER, WEST, ASHHURST.	0	180	225	120	200	80
3. ROSEN, WIECHEC AND KRUSEN, CLARK, ROBINSON, AAF. *	0	180	145	120	180	60



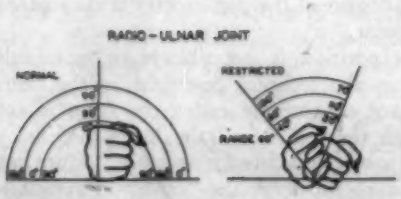
	NORMAL		ABNORMAL		
	ADD.	ABD.	ADD.	ABD.	RANGE
1. ARMY, SILVER, HELLEBRANDT AND MILES, WIECHEC AND KRUSEN, ASHHURST, CAVE AND ROBERTS.	0	180	0	65	65
2. WEST, ROSEN, AAF, CLARK AND MOLANDER.	180	0	180	115	65



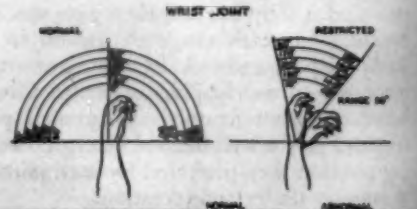
	NORMAL			ABNORMAL		
	INT. ROT.	A.P.	EXT. ROT.	INT. ROT.	EXT. ROT.	RANGE
1. CAVE AND ROBERTS, ARMY, HUTTER, ASHHURST, ROSEN, HELLEBRANDT AND MILES.	90	0	90	15	20	35
2. CLARK, WIECHEC AND KRUSEN.	0	90	180	75	110	35
3. AAF.	180	90	0	105	70	35



	NORMAL			ABNORMAL		
	FLEX.	MID P.	EXT.	FLEX.	EXT.	RANGE
1. SILVER, ARMY, CAVE AND ROBERTS, HELLEBRANDT AND MILES.	180	90	0	70	-35	35
2. WIECHEC AND KRUSEN, WEST, ROSEN, CLARK, ASHHURST, SMEDRECOR, AFF, ROBINSON, MOLANDER.	0	90	180	110	145	35
3. CONWELL	90	0	90	-20	35	35



	NORMAL			ABNORMAL		
	PRO.	MID P.	SUP.	PRO.	SUP.	RANGE
1. ARMY, SMEDRECOR, CAVE AND ROBERTS, HUTTER, ROSEN, HELLEBRANDT AND MILES.	80	0	90	20	40	60
2. ROBINSON, AAF.	180	90	0	110	50	60
3. WIECHEC AND KRUSEN, ASHHURST.	0	90	180	70	130	60



	NORMAL			ABNORMAL		
	PALMAR FLEXION	A.P.	DORSAL FLEXION	PALMAR FLEXION	DORSAL FLEXION	RANGE
1. ARMY, SILVER, CORE, CAVE AND ROBERTS, HEWITT, HELLEBRANDT AND MILES.	90	0	90	40	10	50
2. WEST, ASHHURST, MOLANDER.	90	180	270	140	60	80
3. MCV.	0	90	180	50	100	50
4. ROSEN, WIECHEC AND KRUSEN, CLARK, ROBINSON.	90	180	90	140	170	30
5. AAF.	180	90	0	150	80	70

Figure 3.

adequate directions for placement of the goniometer, operators use a variety of placement technics. This practice leads to much inconsistency, interoperator variation and possibly a reduction in the degree of reliability of the obtained measurements. While the standard practices of different therapists may be expected to vary, these might well be partially controlled within any one department in the

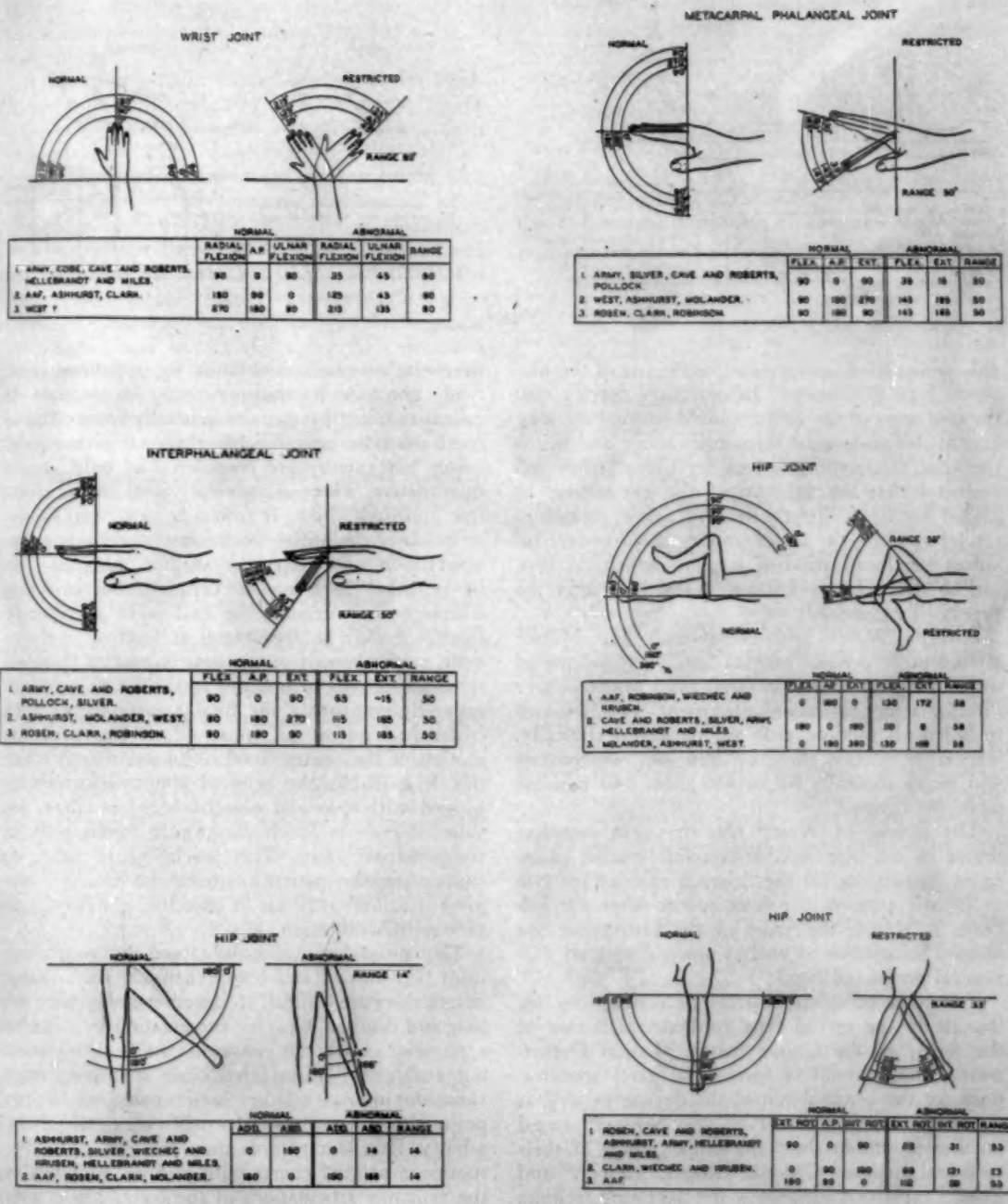
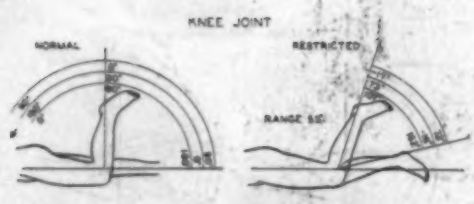


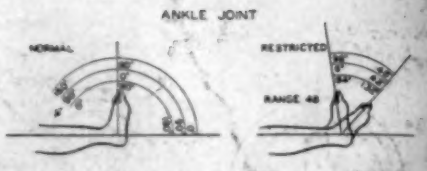
Figure 4.

interests of improved reliability of data accumulated in the day by day study of large numbers of cases. This can be accomplished by establishing within a clinic a definite technic to be followed by all therapists. Indeed, careful study of the principles involved suggests that there is a "one best way" of performing this manipulative skill and that its rationale is defensible.

Clark,[35] Robinson,[7] Wiechec and Krusen,[1] Rosen,[8] Conwell,[4] Ashhurst,[16] and Molander[5] give



	NORMAL			RESTRICTED		
	FLEX.	MID P.	EXT.	FLEX.	EXT.	RANGE
1. MOLANDER, ROBINSON, WIECHEC AND KRUSEN, ASHHURST, ROSEN, CLARK, AAP	0	90	180	107	162	55
2. CAVE AND ROBERTS, SILVER, ARMY, HELLEBRANDT AND MILES.	180	90	-0	73	-18	55
3. CONNELL.	90	0	90	-17	72	55



	NORMAL			ABNORMAL		
	DORSI FLEX.	A.P.	PLANTAR FLEX.	DORSI FLEX.	PLANTAR FLEX.	RANGE
1. WEST, AAP, MOLANDER, ROBINSON, WIECHEC AND KRUSEN, ASHHURST, ROSEN, CLARK.	0	90°	180	84	132	48
2. CAVE AND ROBERTS, HUTTER, CROWLEY, HELLEBRANDT AND MILES.	90	0	90	0	42	42
3. SILVER, ARMY.	180	90	0	90	45	45

Figure 5.

only generalized instructions for the use of the universal type goniometer. Briefly, they specify that the two arms of the device should parallel the long axis of the anatomical lever arms above and below the joint in question. Except for Clark[35] they recommend that the fulcrum of the goniometer be placed first of all directly over the axis of motion of the joint. Thus, the initial step in the procedure involves the localization of a point which, at best, can be selected only arbitrarily and only after the part has been moved.

Silver,[13] West[33] and Hellebrandt and Miles[17] offered more definite instructions. They designated definite bony landmarks and gave much clearer directions for instrument placement. The first two included all motions that are measured clinically. The latter writers chose isolated joint movements and many clinically important joints and motions were not covered.

The technic of West[33] was the most complete found in the literature. It contains specific placement instructions for the fulcrum and for the two individual arms of the instrument. After the fulcrum is placed, the arms of the instrument are aligned to coincide as well as possible with all anatomical points indicated.

The most complete manual of instructions for the use of the special type goniometers is that of the Army of the United States, Medical Department. This manual of instruction gives specifications for the construction of the devices as well as directions for their use. Fox[2] and Nutter[25A] relied on illustrations to show the proper usage of their tools and methods. Gifford,[15] Rosen,[8] Hewitt,[23] and Cobe[24] explained adequately the operating technics of their instruments. The very nature of construction of the special type instruments controls to a degree their usage and placement.

Summary

Where quantitative evaluation of the restriction present in the joints of the body is important, measurements may be best obtained by instrumentation. Such goniometric measurements, in contrast to estimates taken by eye, are generally recognized as more accurate and reliable than subjective judgment, but usually are considered as only grossly quantitative. There are several values in the objective approach. First, it fosters a clear, concise description of the initial condition of the joints under observation. By repeated studies progress can be recorded in terms of demonstrable evidence. Through these records the end point of effective treatment may be recognized as soon as it is evident, to the benefit of the patient and to those responsible for his care either medically or economically. By comparing the final measurements with established norms or, more effectively, with the motion of the contralateral uninvolved limb when this is available, the residual abnormality can be judged with maximal objectivity. Here, then, are valuable records which may figure significantly in compensation cases. The psychological value in stimulating the patient's interest in his own progress is a final attribute of objective goniometry to rational rehabilitation.

The numerical values obtained by measuring must be recorded in a comprehensible way. Verbal descriptions are difficult to interpret unless they are long and detailed. Graphic presentation by means of a pictorial sketch can convey a complex idea without ambiguity. Misunderstanding stemming from variations in nomenclature is eliminated, and a composite description is shown with maximal intelligibility. Excellent records may be kept on rubber stamp or printed charts with outline drawings of the principle articulations of the body. These individual figures show the entire moving part and a portion of the fixed part. An arbitrarily fixed point is designated as the axis of motion in order to convey the circular movement pattern of the joint. The moving part acts as the radius of this circle and the periphery of the superimposed circle is calibrated in degrees. Little description or explanation is then

needed in order to easily and clearly interpret the limits of motion of the joint as recorded on such a sketch.

It is clearly evident from a review of the literature that most investigators have been incorrigibly independent in their approach to goniometry. Many methods have been developed with little or no comparison with pre-existing ones. Methods and observations must be amenable to universal comparison in order to fulfill their clinical usefulness. Many appreciate that positioning of the patient and the measuring tool must be standardized, but few have clearly and completely expressed these concepts in manuals of instruction. Assumptions should give way to fact and the technic proposed must be defensible as to its rationale. Objectivity should take the place of subjective judgment and a logical, complete, standardized technic should take the place of widespread conflicting methods.

Acknowledgment—The author wishes to express sincere appreciation to Dr. F. A. Hellebrandt, her major professor, under whose guidance the M.S. thesis titled "Clinical Measurement of Joint Motion" was written, and to Dr. Ellen Neall Duvall for assistance in the preparation of the material.

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Reservations

Make your reservations now for the 1949 Annual Conference of the American Physical Therapy Association. Use the reservation blanks on page 239 of this issue.

The Need for *Physical Therapy in Postpartum Care*

Willie Rebecca Harvey, 1st Lt., WMSC

At the Station Hospital, Fort George G. Meade, Maryland, a program was initiated and has been in operation over a period of six months for the physical therapy department to give postpartum exercises to all obstetrical patients. The advisability of starting such a program was apparent after observing case histories of women patients coming to the orthopedic clinic with backaches.

Over a period of approximately eighteen months, thirty or more women patients reported to the orthopedic clinic with backaches. The case histories of these patients did vary in some respects, but a common picture was observed. All of these patients had babies varying from the ages of one month to two years. The backache had been experienced to a mild degree over a period of several years and had become exaggerated with pregnancy; or the backache had its onset with pregnancy and had become progressively worse until the patient reported to the orthopedic clinic for treatment.

Two typical case histories are presented as recorded by the chief of the orthopedic section:

Case 1—Patient gives history of low back pain of three months' duration, beginning after the birth of twins. No history of trauma. Pain is dull and aching in character, aggravated by activity, especially when assuming the upright position. Pain is nonradiating, not aggravated by cough or sneeze or changes in the weather.

Examination of the Back: No kyphosis or scoliosis. There is evidence of lordosis. No perispinous spasm. Both gluteal folds are equal. No pain to percussion of the spine. No pain to pressure over the lumbosacral joint or sacroiliac joints. Forward bending is normal but pain and discomfort is produced over the lumbosacral joints when assuming the upright position. Backward and lateral bending are within normal limits. Straight leg raising test, normal. Patrick signs negative bilaterally. Knee and ankle jerks active and equal. Pelvic roll negative. Eli signs negative bilaterally. Hyperextension of both hip joints normal. X-rays of lumbar spine, negative.

Case 2—Twenty-eight year old woman who has had more or less constant pain in her low back ever since a pregnancy one and one-half years ago. This began during the latter part of her pregnancy and has persisted more or less ever since. She was treated at the gynecology clinic last fall for a retroverted uterus and wore a pessary for a few months. Pain seems to be worse after sitting for a long time. It does not keep her awake at night, is nonradiating, is not aggravated by cough, sneeze or inclement weather. Pain has increased in recent months. However, she has been doing some strenuous physical activity, such as painting and house cleaning during the past few weeks. She has worn a girdle, but this does not give relief.

Examination of the Back: Both shoulders are same height. Patient stands with accentuated lumbar lordosis. Appears to be lack of tone in the abdominals. No kyphosis or scoliosis of the spine. No pain to percussion of the spine. No erector spinae spasm. Both iliac crests are equal in height. Right gluteal fold is slightly lower than the left. All back bending tests are within normal limits. Pain is concentrated in lower lumbar spine. Straight leg raising tests and Patrick signs are negative. Goldthwait sign, negative. Pelvic roll, negative. Knee and ankle jerks are active and equal. Eli signs negative bilaterally. Hyperextension of both hip joints, normal. X-ray of lumbar spine, negative.

At first these patients were sent to the physical therapy clinic for the common treatment of heat and massage. A certain amount of temporary relief was obtained from such treatment, but the desired results were not forthcoming. It was suggested to the orthopedic section that if these patients had no history of trauma, X-ray reports were negative and there were no other contraindications to exercise, that a program of exercises be tried to correct the existing postural defects. Such a program was put into effect and has become a routine procedure with similar cases.

Exercises are taught to the patient according to her existing postural deviations. When the patient learns to perform her exercise routine to the satisfaction of the physical therapist, she continues the exercises at home as instructed. She reports back to the orthopedic and physical therapy sections for periodic checkups. In every case where the patient has conscientiously performed her exercises, definite improvement has been noted. Desired results have been obtained in view of the original complaint.

From the standpoint of the physical therapist, the following things were noted in these patients:

(1) The backache either had its onset with or

Station Hospital, Fort George G. Meade, Maryland.

was exaggerated by pregnancy.

(2) The pain experienced was similar in character, with the focal point of pain in the lumbar area of the spine.

(3) Only one patient had received postpartum exercises.

(4) All patients had poor strength and poor control of the abdominal muscles.

(5) All patients had marked or moderate lordosis with accompanying tight erector spinae muscles in the lumbar area.

(6) Some patients had other posture deviations in varying degrees.

The cause and possible prevention of such backaches in women was studied. Observations, theories, facts and statistics on related subjects from sources of authority are quoted:

"Low back pain is most common between twenty and fifty years. Women often date its onset from pregnancy. In most patients, initial symptoms date from twenty-five to thirty-five years of age when the muscles begin to lose tone.

"Acute or chronic strain of the low back (occupational or recreational) frequently due to faulty posture and muscular insufficiency is probably the commonest cause of backache. Pain may occur anywhere in the back but its most common location is in the lower portion.

"Long standing mechanical changes are believed to be a common cause of backache in multiparous women. The relation between gynecological disorders and backache has been commented upon frequently. Gynecological conditions causing low backache include mechanical changes incident to repeated pregnancies, disease of the tubes or ovaries, myoma uteri, retroposition of the uterus, tumors of the uterus (especially late stages of carcinoma of the cervix), cervicitis, et cetera. Factors which may act as contributory causes to the mechanical changes present in these patients include flat feet, poor posture, hemorrhoids, constipation, fatigue, anxiety neurosis following economic or marital difficulties, and possible focal infection.

"The force of gravity is usually transmitted in a line passing posterior to the lumbar vertebral bodies and bisecting the sacroiliac joints. Normally the vertebral column presents four curves, anterior in the cervical and lumbar regions and posterior in the thoracic and sacral portions. During pregnancy, there occurs an increase in the normal lumbar lordosis, resulting in compensatory changes in the dorsal and sacral spines. This is aided by the relaxation of the soft tissues accompanying pregnancy. Following the change in the lumbar curve, the pelvis, because of its attachment to the spine at the sacroiliac joints, is tilted and rotated anteriorly, increasing the sacral angle.

"Due to the effect of the gravid uterus, the increased lumbar lordosis, the dorsal kyphosis and the anterior tilt of the pelvis, stretching and thinning of the abdominal muscles with shortening of the long muscles of the back occurs. With future pregnancies, obesity and fatigue, the abdominal muscles become still further stretched and thinned with resultant loss of tone, and the traction of the posterior muscles becomes unopposed. With lordosis of the lumbar spine, and spasm of the erector spinae and atonic abdominal muscles, backache usually results.

"Although retroposition of the uterus may be a cause of back pain, one must not promise that relief of this condition will produce a prompt cessation of the pain. Although a retroposition may be present, the back pain may be due to other conditions, such as faulty posture."[1]

"The abdominal wall relaxes as pregnancy advances, and grows thinner, especially around the navel. In primiparas the abdominal walls are tenser and sag less than in women who have borne children. Sometimes the linea alba gives way to the strain, the recti muscles separate, and the pregnant uterus falls forward between them, covered only by a thin layer of skin and peritoneum. The belly becomes pendulous and not seldom the condition gives rise to dystocia."[2]

"Upward pressure of the growing uterus on the diaphragm should interfere with respiration. This, however, is counteracted by compensatory broadening of the chest wall and a change from abdominal to thoracic breathing."[3]

"The female pelvis with its larger size, its large organs and greater blood supply, may be seriously affected by faulty body mechanics. In some women's colleges where carefully supervised physical education is carried on, the painful menstruation so common in young women has been greatly helped by an improvement in the habitual use of the body. The reason for this can be understood when one realizes how much circulation in the pelvis can be affected by the position of the organs. Much of the gynecologic disability and long periods of weakness following some pregnancies can be explained on the theory that the compensation for long-standing faulty body mechanics has been broken by the burden of pregnancy and parturition, and that once this has occurred, the body is unable to regain its compensation and strength. A proper understanding of the correction of faulty body mechanics would avoid much of this trouble."[4]

"If treated early, good response may be obtained by simple procedures including rest, heat, massage, postural exercises, support to the low back and to the weakened anterior abdominal muscles, and reduction of weight if obese. If untreated, various

complications may occur such as strain of ligaments, degenerative joint diseases, horizontal sacrum and migration of the nucleus pulposus."[1]

"Too often when a patient comes to a doctor complaining of backache, an attempt is made to trace the symptoms to one specific cause: the orthopedic surgeon looks at the spine, the gynecologist at the pelvic organs, the neurologist considers the backache a form of neurosis, the internist a symptom of improper intestinal function, and so on. When, however, the patient is examined from the point of view of body mechanics, it is very quickly realized that even though the predominant symptom may be backache, the faulty mechanical condition present must affect not only the back, but every other organ or system to a greater or lesser extent. Therefore, to treat only the back or the pelvic organs or the nerves or the intestinal tract, is to envisage only a small part of the picture. Of necessity the emphasis is here laid mostly on the correction of the spinal mechanics, but as has been said previously, what is done to correct the spinal mechanics will also correct the faulty mechanics of the rest of the body."[4]

For the physical therapist, the possible prevention of such conditions in women is a real challenge. For her, it is necessary to consider the important changes that take place during pregnancy as they affect her approach to the problem:

Muscles: The anterior abdominal muscles relax and grow thinner, especially around the navel. Sometimes the recti muscles separate (diastasis). This occurs more often in the multipara and multiple primipara. It also occurs in the primipara but the width of separation is not as great.

Due to the more pronounced lordosis, the erector spinae muscles become shortened and tight.

The muscles on the pelvic floor become stretched and sometimes tear or an episiotomy is done to keep the muscles from stretching beyond the point of its elasticity.

Posture: The pelvis is rotated anteriorly and there is an increase in the normal curve in the lumbar spine. Other postural deviations occur, such as forward head and round shoulders.

Respiration: In the later months of pregnancy, the growing uterus presses against the diaphragm, causing action of this muscle to practically cease. The respiration changes from abdominal to thoracic breathing and becomes shallow and fast.

Using these facts as a basis for the kind of exercises necessary, the physical therapist worked out a tentative routine to be done during the early postpartum period. With the guidance of the physician and the nurse, exercises were tried over a period of time to determine those that seemed best suited to the patient and showed prospects of producing desired results. The time element in relation to delivery was considered as well as the response of the patient in performing the exercises —whether they caused pain, overtaxed the patient, or produced complications.

POSTPARTUM PHYSICAL THERAPY PROGRAM

(1) Exercises are started on the patient approximately:

Twenty-four hours after delivery on a multipara.
Forty-eight hours after delivery on a primipara.

(2) The exercises are taught to the patient in bed.

(3) At the first exercise period, the physical therapist explains to the patient why these exercises are being taught to her and the plan of the whole program as it will affect her.

(4) At the first exercise period, pertinent information is secured so a record of progress may be kept.

a. Age.
b. Number of full term pregnancies.
c. Weight before pregnancy.
d. Weight at full term of pregnancy.
e. Weight of baby.
f. A measurement is taken of the circumference of the patient at the level of the umbilicus, with the patient standing. This is recorded with a relaxed abdominal wall and then with a contracted abdominal wall.
g. A test[6] is made for abdominal strength.
h. A test is made for the presence of diastasis of the rectus abdominus muscle and the width of the separation recorded. Method of testing for diastasis is as follows:

Position of patient: Supine lying, knees bent, feet flat on bed, arms extended at sides.

Have the patient raise her head off the bed until the abdominal muscles contract. With the hand in the vertical position, fingers together, the balls of the fingers are placed in the midline of the abdomen, either just above or just below the umbilicus. While applying a moderate amount of pressure, the hand is moved back and forth lateral to the midline and the taut sides of the rectus muscle are felt. The width of the separation is estimated. The separation is greater at the umbilicus.

In a very pronounced diastasis, three inches or more, it sometimes is necessary to apply pressure nearer the sternum or symphisis pubis and follow the separa-

tion toward the umbilicus to determine the width. In a case like this, the rectus muscle is so stretched and thinned that it is hard to feel the muscle at the level of the umbilicus.

i. Information is secured as to whether the patient had postpartum exercises with previous confinements.

(5) The day the patient is discharged from the hospital, tests and measurements are repeated to note progress in the patient.

General Plan of the Program: During hospitalization the physical therapist gives the patient daily instruction in the exercises. Since the length of hospitalization averages six days, the patient receives instruction in the exercises for about four days. The exercises are presented gradually until, by the time the patient leaves the hospital, she will be doing the complete routine of exercises as prescribed.

The patient is to continue doing this first series of exercises at home, daily, until she reports back to the postpartum clinic for her six weeks' checkup. That same day she reports to the physical therapy clinic for a checkup by the physical therapist and to receive instructions in the second series of exercises. This second series is continued over a period of time necessary for the desired results to be obtained.

POSTPARTUM EXERCISES—FIRST SERIES

(*Note:* These exercises are written in terms understandable to the patient.)

(1) *Berathing Exercise:*

Position: Back lying, knees bent, feet flat on floor, arms by head in a relaxed position.

Exercise: Inhale slowly and deeply, expanding and swelling the chest upward and ballooning the abdomen moderately (Fig. 1-A). Hold the chest up and exhale by contracting the abdominal muscles (Fig. 1-B). (Keep holding the chest up!) Inhale again—exhale—then relax the chest wall. Repeat about ten times in succession.

Figure 1. Breathing exercise. A—Inhalation. B—Exhalation.

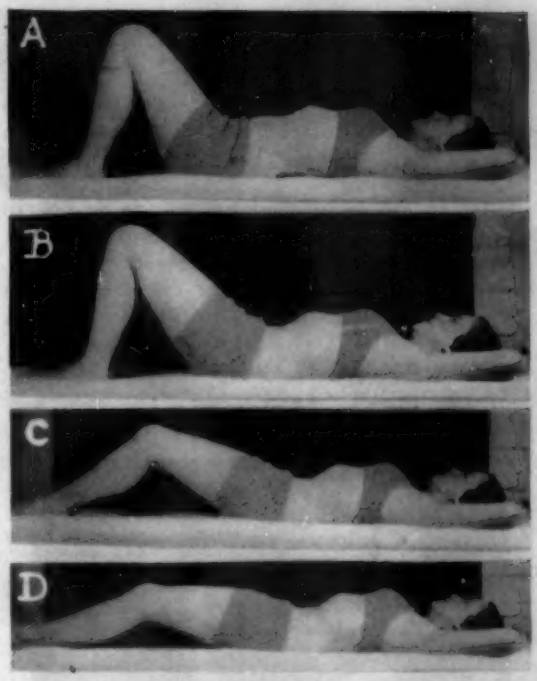

Figure 2. Pelvic tilt. A—Position. B—Knees up. C—Knees halfway down. D—Knees all the way down.

(2) *Pelvic Tilt:*

Position: Back lying, knees bent, arms by head in a relaxed position (Fig. 2-A).

Exercise: Pull in on the abdominal muscles and roll the pelvis backward, pressing the low back to the floor (Fig. 2-B). Hold—relax and repeat.

Extend the knees halfway and do the same exercise (Fig. 2-C).

Extend the knees all the way and do the same exercise (Fig. 2-D).

Repeat approximately ten times in each position.

(3) *Gluteal Setting:*

Position: Back lying, arms extended by sides, legs extended and together.

Exercise: Squeeze the buttocks together, tightening the large muscles of the seat, and the muscles on the pelvic floor, as if you were checking a bowel movement.

Relax and repeat about twenty-five times.

(4) *Abdominal Exercise:*

Position: Back lying, knees bent, feet flat on floor, arms extended at the sides.

Exercise: Tuck the chin in and roll the head

forward and up off the floor, lifting it up as far as possible. Slowly lower head back to floor (Fig. 3-A).

Advance to: Same position, except reach the arms forward and raise the head and shoulders from the floor (Fig. 3-B). Slowly lower back to position. Work to raise the whole back from the floor, but the shoulders never higher than from ten to twelve inches from the floor (Fig. 3-C). It is not necessary to come to a complete sitting position. Gradually increase the number of times you do this exercise daily, according to the way you feel.

NOTE: Do your exercises on the floor. It is very important that you *do them once daily.*

(A mimeographed copy of these exercises is given to each patient when she leaves the hospital).

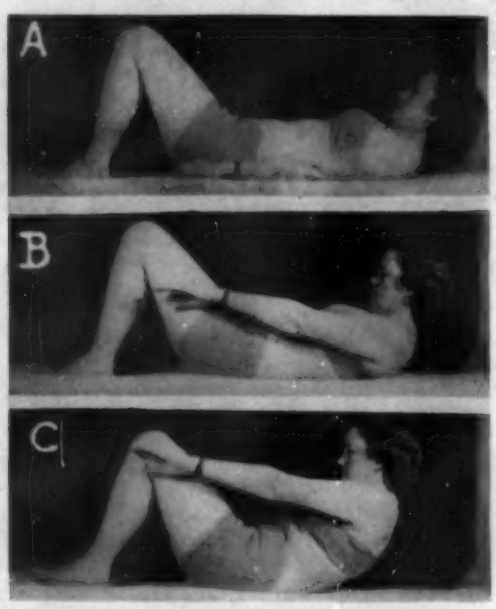

Figure 3. Abdominal exercise. A—Raise head, arms at sides. (Poor.) B—Raise head and shoulders, arms reaching. (Fair.) C—Raise head and shoulders and whole back, arms reaching. (Good.)

There are definite reasons for each exercise given in this first series:

(1) *Breathing Exercise:*

a. The abdominal muscles have been so stretched that the patient practically loses voluntary control of them. This exercise makes her feel the action and how to gain control of the anterior abdominal muscles.

b. It is a means of exercising the diaphragm which has been inactive during the last months of pregnancy.

c. In a remote way, it is a means of stimulating the circulation in the region of the breasts, as it brings into play the underlying intercostal muscles.

d. It increases the chest expansion and makes for more complete and normal breathing.

(2) *Pelvic Tilt:*

a. The purpose of this exercise is to produce more strength and control of the abdominal muscles.

b. It tends to bring the bony structure of the pelvis back into a more normal position and reduce the acquired lordosis.

c. It mildly stretches the erector spinae muscles in the lumbar area.

d. Causing contraction of the abdominal muscles helps to bring the pelvic organs back into position.

(3) *Gluteal Setting:*

a. The main purpose of this exercise is to regain control and tighten the stretched muscles of the pelvic floor.

b. It increases circulation to the pelvic area and makes for better healing of existing repairs.

There have been no complaints from performance of this exercise as might be supposed. Even when an episiotomy has been done or a tear occurs, the patient experiences no pain in executing this exercise.

(4) *Abdominal Exercise:*

a. This is the main exercise for securing strength in the anterior abdominal muscles.

b. It is a means of reducing or completely closing the existing diastasis of the rectus abdominus muscle.

When the patient reports to the physical therapy clinic for her six weeks' checkup, tests and measurements are taken again and recorded. The physical therapist also makes a check on the patient's general posture. If postural deviations are present that will not be corrected by the routine second series of exercises, other exercises are added to this group according to the needs of the patient. The patient is informed as to the end results she is working to attain in each exercise and she is instructed to continue the exercises until this goal is reached.

By the time the patient reports for her six weeks' postpartum checkup, the abdominal muscles usually are well under control and the strength has advanced from a grade of poor or fair to good. A second series of exercises has been worked out to further strengthen the abdominal muscles to a grade of normal and correct the general postural defects. The patient learns the proper body mechanics in sitting, standing and walking. She gets strength and control of the involved muscles with the first group of exercises and learns how to put this to use in this second series of exercises.

Figure 4. Exercise to stretch the low back muscles. A—Position. B—Pull knees to chest.

Figure 5. Exercise to strengthen the oblique abdominal muscles. Reach the arms forward and to the side of one knee, raising the head and shoulders from the floor.

POSTPARTUM EXERCISES—SECOND SERIES

(1) *Exercise to Stretch the Low Back Muscles:*

Position: Back lying, knees bent, feet off the floor, hands on knees, arms extended (Fig. 4-A).

Exercise: Bend arms and pull knees to chest. Relax—and repeat. Keep working until you can touch knees to chest (Fig. 4-B).

Repeat from six to ten times.

(2) *Abdominal Exercise:*

Position: Back lying, knees bent, feet flat on floor, arms extended by the sides.

Exercise: Reach the arms forward toward the knees and raise the head and shoulders from the floor, trying to bring the shoulders to a height from ten to twelve inches from the floor. Slowly lower back to position.

When you can accomplish the above several times without too much effort, *advance to:* same position, except place the hands behind your neck and do the same exercise.

NOTE: In doing this exercise, come up from the floor slowly and then slowly lower yourself back to the floor. Gradually increase the number of times you do this exercise daily.

(3) *Exercise to Strengthen the Oblique Abdominal Muscles—Trunk Rotation:*

Position: Back lying, knees bent, feet flat on the floor, arms extended by the sides.

Exercise: Reach the arms forward and to the side of one knee, raising the head and shoulders from the floor (Fig. 5). To do this, you will have to twist the trunk. Work to raise the shoulders to a height of from ten to twelve inches from the floor. Return to position and repeat, reaching to the side of the opposite knee. Alternate.

Advance to: Same exercise with hands placed behind the neck.

(4) *Mild Back and General Posture Exercise, Hamstring Stretching:*

Position: Sitting on the floor, knees bent to a comfortable angle but not too close to the body, feet flat on floor, one hand grasped around each knee (Fig. 6-A).

Exercise: Extend the whole body up toward the ceiling, chin in, chest raised and abdominal muscles pulled in. Keep the shoulders relaxed—make your back do the work—not your arms! Get the feeling that you are going to press the top of your head flat onto the ceiling (Fig. 6-B). Relax and repeat several times.

Progression: Same position except extend one leg, keeping it flat to the floor. Both hands grasped around the same knee. Push up toward the ceiling as before (Fig. 6-C). Relax and repeat several times. Change legs and do the same.

Figure 6. Mild back and general posture exercise, hamstring stretching. A—Position. B—Exercise, with both knees bent. C—Exercise, with one leg extended.

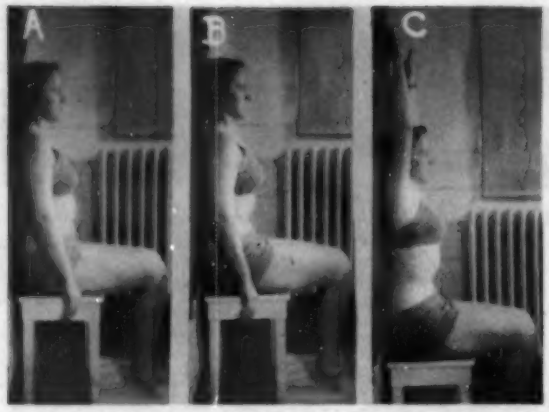

Figure 7. General posture exercise. A—Sitting position. B—Pull in abdominals, press low back to wall. C—Exercise, arms raised.

(5) *General Posture Exercise:*

Position: Sit on a stool placed against the wall. Sit so your back, buttocks and head touch the wall, chin in. Feet flat on the floor, knees bent so the knees and thigh make a right angle. Arms hanging at the sides (Fig. 7-A).

Exercise: Pull in on the abdominal muscles, roll the pelvis backward and press the low back tight to the wall (Fig. 7-B). Be sure to keep the whole back and head against the wall. Relax and repeat several times.

Same Position: Pull in on the abdominal muscles, roll the pelvis backward, pressing the low back to the wall, hold this position while you raise the arms forward and upward, touching the arms to the ears if possible (Fig. 7-C), and lower arms back to position. Relax, assume starting position and repeat. Repeat entire exercise several times.

NOTE: If in raising the arms, the low back comes out from the wall, even with your effort to hold it in, raise the arms to only such height as will still permit you to keep touching the wall with the low back. Keep working to raise the arms higher and still maintain the proper position.

Progression: Do these same exercises standing against the wall, the feet placed about two inches from the wall (Figs. 8-A, B, C).

NOTE TO PATIENT: Keep making a conscious effort to pull in on your abdominal muscles when you are standing or sitting. If you make the effort long enough, it will get to be a habit.

It is necessary to make some general remarks concerning the routine of exercises presented here in relation to other exercises generally used for postpartum care.

The commonly used knee-chest position has been eliminated in the program by mutual consent of the obstetrician and the physical therapist on the grounds that it is a purely passive exercise. If the purpose of it is to cause the misplaced pelvic organs to return to their proper position, they will not remain so unless the abdominal muscles are tightened to hold them there. The same is true of the commonly practiced exercise of walking on all fours.

Another commonly practiced exercise, double leg raising while in a supine position, was included in programs of postpartum care from practically every source studied, namely: obstetrical books accepted as the most outstanding authority, books used in obstetrical nursing care, pamphlets distributed by obstetricians, and a recently published book on physical medicine.

Figure 8. General posture exercise. A—Standing position. B—Pull in abdominals, press low back to wall. C—Exercise, arms raised.

On questioning patients in this hospital concerning previous postpartum exercises, it was found that double leg raising was given to them in the exercise routine. They particularly remembered this exercise because it was difficult for them to do.

Double leg raising is given to strengthen the abdominal muscles, but unless the person performing the exercise has normal or above-normal strength in the abdominal muscles, these muscles are not brought into play.

"Leg raising from a supine position is in itself purely a hip flexor action (assisted by quadriceps if knees are maintained in extension). The movement may be done in one of two ways and may or may not be combined with abdominal action depending on the position of the pelvis.

"(1) If the back is allowed to hyperextend as the legs are raised, the abdominal muscles will be put on a stretch and the entire movement accomplished by the hip flexors.

"(2) However, if the patient is asked to flex the pelvis on the trunk, that is, 'roll the pelvis' to flatten the lumbar spine on the table and hold it in that position *as the legs are raised,* the abdominal muscles must act to hold the pelvis in that position. The work of the abdominals is to approximate the pubis toward the sternum and maintain it there against the weight of the legs, which as they are lifted, exert a strong pull downward on the pelvis in opposition to the abdominal pull.

"When the abdominal muscles are weak and hip flexors strong, the back cannot be held flat as the legs are raised. Therefore attention must be focused on the position of the pelvis during the leg raising movement itself."[3]

Double leg raising should not be used as a therapeutic exercise to strengthen the abdominal muscles. To use this exercise in postpartum care actually will do more harm than good. These patients have poor abdominal strength and do not gain good strength, at the earliest possible time, until at least one month after delivery. If the postpartum patient should attempt to do such an exercise eight to ten days after delivery, as has been advised in postpartum exercise programs, the lumbar lordosis, in need of correction, actually will become more accentuated.

The common practice in the presentation of a postpartum exercise program is to hand the patient a pamphlet with written exercises for her to do. To have one patient teach another patient exercises is another method. Sometimes the physician shows the patient the exercise routine once and leaves her to continue on her own.

To do an exercise improperly is just as bad, if not worse, than not doing an exercise at all. Written exercises, not previously taught, will get as numerous interpretations as there are patients. Persons who are trained in the interpretation of written exercises have difficulty, at times, in performing an exercise as it was originally intended by the initiator.

The response and physical coordination of each patient is different. It has been found that it takes four days of instruction received during hospitalization to be assured that the patient is performing her exercises properly. During this time she learns to feel her exercises; she knows when she makes a mistake in position or performance.

In working with these patients, it is important to have a program that appeals to the patient. The exercise program needs to be simple and not too time-consuming. The mother of a young baby is a busy person, her day is filled with activity and even more so if she has several other children. To ask her to take too much time for herself will end in neglect of herself.

Each series of exercises in this program takes fifteen minutes, at the most, to perform. The patient is told that the most important factor in carrying out the program is to do the exercises *once* daily. This is much more important than to do them three or four times in one day and then skip two or three days.

It is the job of the physical therapist to sell the importance of the postpartum exercise program to the patient. She can appeal to the patient from a health standpoint as well as a cosmetic one. Most women are concerned about their appearance as well as their health. The progress that is noted during the four days of exercise in the hospital is such that the patient is inspired to continue the exercise at home until she is back to normal.

When this program was initiated, the plan was to have the patient return to the physical therapy clinic for a checkup and instruction in the second series of exercises when her baby was one month old. This involved too many trips to the hospital for the busy mother, so the time was changed to six weeks to coincide with her postnatal checkup with the physician, thus making one trip take care of both.

Observations, Results and Comments on One Hundred Patients Who Participated in the Postpartum Exercise Program as Described

General Comment: All patients received exercise instruction during hospitalization. Whether all patients continued the exercises at home, as instructed, is not known. Not all patients returned for their six weeks' postpartum checkup with the physician or the physical therapist. This can be explained, in part, by the fact that this is an army installation and during the course of six weeks many transfers take place. This hospital services an area of one hundred miles or more, and it is difficult for the patients to get back for their required checkups. For these reasons, a complete record of progress on all of the one hundred patients is not available. The progress made in all patients during hospitalization, and the progress made by the patients who completed the whole program, shows sufficient evidence to justify the success of the program.

The cooperation of the patient is the greatest factor in the success of any program of treatment. The general response of the patients to the program has been definitely enthusiastic.

Over a period of six months no patient who has received postpartum exercises has reported to

the orthopedic clinic with the complaint of a backache. On questioning each patient at the six weeks' checkup, only one has complained of a backache, and this patient had not carried out the exercise program as instructed. Her case history is revealing. This twenty-six year old patient delivered her third baby at this hospital. Twenty-four hours postpartum, she had a diastasis four inches wide. Muscle tone, control and strength were poor. The progress made during hospitalization was negligible. She reported back to the postpartum clinic at the end of three months instead of six weeks as instructed. On examination by the physician, she was found to have a retroposition of the uterus and she complained of a severe backache. The physician sent her to the physical therapy clinic. The physical therapist talked to the patient but learned that there was little that could be done for her. Due to overtaxing household duties involved in caring for three small children, this patient could neither arrange to come for treatment at the physical therapy clinic nor take time to try to carry out a program of exercises at home. She is now wearing a back brace and abdominal support, given to her at another hospital after her second postpartum period. This case has been cited to show the complications that can arise from pregnancies occurring close together with no exercise program being carried out during the early postpartum period. The complications that did occur in this patient may not have been due to this alone, but it is felt that this was a contributory cause.

A similar case is reviewed to show what can be accomplished with the cooperation of the patient in carrying out this exercise program. A twenty-six year old woman had her third baby delivered at this hospital. Twenty-four hours after delivery, she had a diastasis three and one-half inches wide with accompanying poor tone, poor control and poor strength in the anterior abdominals. At the end of four days of exercises, the diastasis reduced to two inches in width, the circumference at the umbilicus changed in a relaxed position from the original measurement of 39½ inches to 38 inches, in a contracted position from 38 inches to 35½ inches. At the end of six weeks, the diastasis measured ½ inch, the abdominal strength had advanced from a grade of "poor" to a grade of "fair", the circumference at the umbilicus measured 36 inches in the relaxed position and 34 inches in the contracted position. On examining the patient's general posture, she had a moderate kyphosis. This patient was given instruction in the second series of exercises and additional exercises for the kyphotic condition. The response of this patient was excellent, and it is believed that she will continue with the exercise program until the desired results are obtained.

Chart I was made up to show tabulated information of the tests and measurements of a representative group of patients.

Age: The ages of these one hundred patients varied from seventeen to thirty-two, the average age being about twenty-five. From observations made, the age factor showed little significance in relation to muscle tone, control or the degree of diastasis. A seventeen year old patient with her first pregnancy had a diastasis equal to that of a thirty year old patient with her first pregnancy. These two patients had approximately the same weight gain with pregnancy and the same weight baby. Forty-eight hours after delivery, and after four days of exercise, both patients had the same muscle strength and muscle control.

The Number of Full Term Pregnancies: Observations show this to be the most important single factor in relation to all the others. The degree of diastasis varies with each pregnancy (whether this would be true after the proper postpartum exercise program after each confinement remains to be seen), the multipara showing a greater degree of diastasis than the primipara. Exceptions to this are a multiple primipara, and a primipara with a pronounced weight gain during pregnancy and a large baby. The muscle tone, control and strength are generally better in the primipara. It takes a longer period of time for the multipara to regain normal strength in the affected abdominal muscles. The multipara has more pronounced postural deviations of the common ones accompanying pregnancy and compensating ones that are developed because of long-standing poor posture.

Previous Exercises: Out of one hundred patients, less than ten had exercises with previous postpartum care. In most cases this consisted of the "knee-chest position" only. Where other exercises were used, the exercise routine included "double leg raising", the patient being instructed to perform this exercise within from eight to twelve days postpartum. None of these patients received supervised instruction in the exercises after they had been shown how to do them once. The most common method of presenting the exercises was by means of a printed form, to be carried out after the patient left the hospital. These patients had previous confinements in civilian and army hospitals.

Weight Gain During Pregnancy and Weight of the Baby: The amount of weight gained during pregnancy and the weight of the baby definitely affect the degree of diastasis, muscle tone, control and strength. A large baby and more fatty tissue within the abdominal wall makes for a greater de-

CHART I—TABULATED INFORMATION, TESTS AND MEASUREMENTS OF A REPRESENTATIVE GROUP OF PATIENTS

	Age	No. Full Term Preg.	Prev. Ex.	Wt. Before Preg.	Wt. at Full Term	Wt. of Baby	Circum. at Umb. Rel.	Circum. at Umb. Con.	Abd. Stren.	Diastasis	Remarks
1st	20	1st	—	134	152	7 lbs 5	32½	31	Poor	½ inch	
2nd							32	30	Fair	None	
3rd							31	29	Good	None	
1st	24	1st	—	123	148	7 lbs 1	35	33½	Poor	½ inch	
2nd							34	32	Fair	None	
3rd							32	30	Normal	None	
1st	24	1st	—	158	179	7 lbs 7	35½	33	Poor	½ inch	
2nd							35	31	Fair	None	
3rd							34	32	Normal	None	
1st	28	1st	—	115	142	7 lbs 11	33½	31	Poor	1 inch	did not
2nd							32	29½	Poor	½ inch	do exercise
3rd							31	28	Fair	¼ inch	regularly
1st	30	1st	—	113	132	5 lbs 14	35	33½	Fair	¼ inch	
2nd							33½	31½	Fair	None	
3rd							31½	30½	Normal	None	
1st	19	2nd	None	98	129	6 lbs 8	33½	31½	Fair	1 inch	
2nd							32	31	Fair	None	
3rd							31	30	Normal	None	
1st	27	2nd	None	130	150	9 lbs 2	36	33½	Poor	1½ inch	sick one
2nd							35	33	Poor	1 inch	week
3rd							33½	32	Fair	None	at home
1st	27	2nd	None	130	148	7 lbs 11	38	37	Poor	1½ inch	
2nd							36	34½	Fair	1 inch	
3rd							34½	31½	Good	½ inch	
1st	32	2nd	None	106	129	7 lbs 4	35	33	Poor	1 inch	
2nd							34	32	Fair	None	
3rd							32½	31½	Good	None	
1st	26	3rd	None	124	153	8 lbs 6	39½	38	Poor	3½ inch	Moderate
2nd							38	35½	Poor	2 inch	Kyphosis
3rd							36	34	Fair	½ inch	

1st—Measurements taken 24 to 48 hours after delivery.
2nd—Measurements taken after four days of exercises.
3rd—Measurements taken at six weeks' checkup.

gree of diastasis, poor muscle tone, control and strength.

Circumference at the Umbilicus: This particular level was chosen for measurement because it is the center of, and the weakest point in, the abdominal wall. After pregnancy, more change has taken place and the circumference is greater at this level. The measurements are taken both in relaxed and contracted positions while the patient is standing. The difference between the two measurements is an indication of muscle control.

The first measurements taken twenty-four to forty-eight hours after delivery show a greater difference between the relaxed and contracted position in the primipara than in the multipara. This is an indication that the muscle tone and control in the primipara generally are better than in the multipara. After four days of exercise, both the multipara and the primipara improve in their ability to contract the abdominal wall. The primipara shows a greater improvement in the relaxed position of the abdominal wall, even though the ability to contract is the same in both the multipara and primipara. After four days of exercise the patients increase the difference in the relaxed and contracted position one-half to four inches. From the standpoint of the physical therapist, this is one of the most outstanding improvements that is noted in the patient during hospitalization.

At the six weeks' checkup, the measurement of the relaxed abdominal wall shows a difference of from two to five inches over the original measurement. The difference between the relaxed and contracted abdominal wall becomes less.

These measurements are significant in the de-

gree of abdominal strength. If, at the six weeks' checkup, a patient still shows a marked difference in the measurement of the relaxed and contracted abdominal wall, she has not obtained good strength in the abdominal muscles.

Due to the fact that no indelible line is marked around the circumference at the level of the umbilicus, the measurements taken at twenty-four hours after delivery, after four days of exercise and at the six weeks' checkup, do not show an accurate relationship. The difference in the two measurements taken at the same period of time is reliable.

Abdominal Strength: All patients are tested for muscle strength in bed twenty-four hours after delivery and after four days of exercise. Since the bed is not a stable surface, the grading of the muscle strength will vary from the usual way of testing on a firm surface. All patients are tested this way, therefore, the relationship of the abdominal strength of one patient to another and of the first testing period to the second will be the same. When this program was started, the patient was put on a litter for muscle testing but this was found to be too time consuming and had to be discontinued.

The first evaluation of muscle strength taken is not too reliable, as the patient is a bit apprehensive and does not respond in the way that she will after four days of exercise. The test made at this time generally shows a grade of "poor" in the multipara and "fair" in the primipara. The muscle test for strength taken after four days of exercise still shows a grade of "poor" in the multipara and "fair" in the primipara. Muscle strength is affected by the degree of diastasis, weight gain, and weight of the baby.

At the six weeks' checkup, the primipara generally has reached a grade of "good" or "normal" in muscle strength, and the multipara a grade of "fair" or "good", all other factors considered.

It is believed that the muscle strength of the woman before pregnancy must have something to do with the regaining of strength after pregnancy. To get a general idea of muscle strength in women before pregnancy, fifteen women were tested and it was found that only two of these fifteen had normal muscle strength. The ages of this group varied from about twenty to thirty. Occupation, sedentary habits, the wearing of girdles, and the general activity of the individual influence the strength and tone of the abdominal muscles.

Diastasis: The degree of diastasis is affected by the number of full term pregnancies, the weight gain, the size of the baby, and multiple births. It has been found that most primiparas have a mild diastasis, varying from one-half to one inch in width. The multipara, multiple primipara, and the primipara with a large weight gain and large baby have a diastasis varying from one inch to four inches.

After four days of exercise the degree of diastasis shows marked improvement according to the diligence of the patient in carrying out the exercise program. In the primipara, the one-half to one inch diastasis completely closes. In the multipara, the degree of diastasis is reduced from one to two inches. At the six weeks' checkup, the diastasis has completely disappeared in both the primipara and multipara in most patients. A few will still have one-fourth to one-half inch separation near the umbilicus.

A control group has not been used to determine whether the diastasis would close spontaneously without the routine of exercise. It has been noted that when patients have complications and exercises are not given until these subside, the patients show no improvement in the closing of the diastasis.

Out of all the patients treated during hospitalization, only one has refused to take the exercises. She was ambulatory twenty-four hours after delivery and had no complications that would contraindicate exercise. She kept offering excuses for not doing them. This patient was a multipara with the fourth full term pregnancy. The first measurements showed a diastasis of two inches, very poor muscle tone, control and strength. She was measured again the day she left the hospital. The relaxed position of the abdominal wall was the same. The contracted position showed a decrease in circumference of one inch over the first measurement. *The diastasis had increased one inch in width.*

CONCLUSIONS

1. That postpartum exercises are an important part of postpartum care is a recognized fact by authorities. Observations made on one hundred patients emphasize the fact that an exercise program is necessary.

2. That many patients do not receive exercise instructions with postpartum care is true in army as well as civilian hospitals.

3. That the kind of exercises used are based on the old system of late ambulation after delivery or are exercises used in physical education programs for well people and cannot be classified as therapeutic exercises.

4. That the method of presentation of the exercise program is generally inadequate.

5. That the condition existing during the postpartum period, such as poor muscle tone, control and strength, and postural deviations, should be

treated by the method best suited to deal with such conditions, namely—physical therapy.

6. That the physical therapist, in making the postpartum exercise program her job, can contribute much to the problems met by the obstetrician, gynecologist and orthopedist. The physical therapist would not be adding to her load of work but would be making it lighter by preventing conditions that usually require physical therapy treatment.

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PHYSICAL THERAPY—*Suggestions for Prospective Students.*
Outlines the professional course of study for college students preparing for physical therapy.

PHYSICAL THERAPY SECTION: *Its Scope and Employment Opportunities.*
This consists of 12 articles by various contributors on physical therapy in a state crippled children's service, public health service, the cerebral palsy field, the Veterans Administration, the industrial clinic, a curative workshop, a large general hospital, a small general hospital, a children's hospital, crippled children's schools, the physician's office or clinic group and the psychiatric field.

CODE OF ETHICS
Ethics for the physical therapist of the American Physical Therapy Association.

PERSONNEL POLICIES FOR QUALIFIED PHYSICAL THERAPISTS
Suggestions as to salary, hours, vacations, etc., by the American Physical Therapy Association.

APPROVED SCHOOLS OF PHYSICAL THERAPY
A list of schools approved by the Council on Medical Education and Hospitals of the American Medical Association.

EDUCATIONAL OPPORTUNITIES FOR PHYSICAL THERAPISTS.
A list of postgraduate programs offered by the approved schools and a list of specialized courses for physical therapists.

CARE OF PATIENTS WITH INFANTILE PARALYSIS: *Correlation in the Nursing and Physical Therapy Services.*
CARMELITA CALDERWOOD HEARST (5c)

POSTURE TRAINING FOR ADOLESCENTS
CAROLYN BOWEN (5c)

THE ORTHOPEDIC SURGEON AND CO-WORKERS IN THE TREATMENT OF POLIOMYELITIS.
C. L. LOWMAN, M.D. (5c)

THE PHYSICAL THERAPIST AND CO-WORKERS IN THE TREATMENT OF POLIOMYELITIS.
LUCILLE DANIELS (5c)

INTEGRATION OF PRINCIPLES OF BODY MECHANICS AND POSTURE IN NURSING: *Demonstration Project at Vanderbilt University School of Nursing.*
MARGARET C. WINTERS. (10c)

PHYSICAL THERAPY AND CHEST SURGERY
FLORENCE S. LINDUFF. (10c)

BED EXERCISES IN EARLY CONVALESCENCE AND AMBULATION.
NILA K. COVALT, M.D. (10c)

THE RESPIRATOR IN THE TREATMENT OF ACUTE POLIOMYELITIS.
DOROTHY GRAVES. (10c)

PHYSICAL THERAPY MANAGEMENT OF LOWER EXTREMITY AMPUTEES.
PAIGE WEAVER. (10c)

TOYS, GAMES AND APPARATUS FOR CHILDREN WITH CEREBRAL PALSY.
GLADYS G. ROGERS AND LEAH THOMAS. (10c)

FUNCTIONAL TESTING AND TRAINING: *Physical Therapy Aspects.*
ROBERT L. BENNETT, M.D., AND HAZEL R. STEPHENS. (15c)

GUTHRIE-SMITH APPARATUS: *Its Construction and Use in Rehabilitation.*
KATHRYN S. BIER (20c)

THE PHYSICAL THERAPY REVIEW—*Special Anterior Poliomyelitis Issue.* July-August 1947 (75c)
The magazine contains 11 articles by leading physicians and physical therapists on research and treatment of polio. There are 16 abstracts of articles on polio from current medical journals.

A HISTORY OF THE AMERICAN PHYSICAL THERAPY ASSOCIATION.
IDA M. HAZENHYER. (50c)
An account of the Association's activities and growth from 1921-1946.

(Continued on Page 218)

New Mechanical Hand

A new mechanical hand is on test at London's Emergency Limb Center, open for repairs to the artificial limbs of Britain's war front and home front (air raid) amputees. It picks up 3/16ths-of-an-inch diameter ball bearings, pins and cigarettes. All of its joints are like those of a normal hand. The illustration shows the mechanical hand with a ball bearing between thumb and finger.

(Photograph supplied by the British Information Services, 30 Rockefeller Plaza, New York 20, N. Y.)

Reprints Available

(Continued from Page 217)

THE PHYSICAL THERAPY REVIEW—*Special Cerebral Palsy Issue.* May-June 1948 (75c)

This magazine contains 8 articles by leading physicians and physical therapists on research and treatment of cerebral palsy. There are 5 abstracts of articles on cerebral palsy from current medical journals.

Available free of charge from Joint Orthopedic Nursing Advisory Service, 1790 Broadway, New York 19, N. Y.:

MAKING PHYSICS A PART OF THE CURRICULUM: *Three methods of incorporating physics in the nursing school curriculum.* HESSEL H. FLITTER, R.N.

SUBSCRIPTION RATE AND CHANGE OF ADDRESS

Yearly subscriptions to THE PHYSICAL THERAPY REVIEW are now $6.00 in the United States; $6.75 outside the United States. Single copies 75c. Send your subscription to the AMERICAN PHYSICAL THERAPY ASSOCIATION, 1790 Broadway, New York 19, New York. Changes in address should also be sent to this office. Both the old and new address must be given.

SCHOOLS APPROVED FOR TRAINING PHYSICAL THERAPISTS

By Council on Medical Education and Hospitals of the American Medical Association

Name and Location of School	Medical Director	Technical Director	Entrance Requirements[a]	Length in Months	Classes Start	Tuition	Certificate, Degree, Diploma
CALIFORNIA							
Children's Hospital, Los Angeles	Samuel S. Mathews	Sarah S. Rogers	a-b-d	14	Sept	$300	Cert. or Degree
College of Medical Evangelists, Los Angeles[1]	F. B. Moor	R. Wm. Berdan	a-b-c-d	12	Sept	$225	Cert. or Degree
University of Southern California, Los Angeles	Charles L. Lawman	Charlotte W. Anderson	a-b-d[2]	12	Sept	$496	Cert. or Degree
University of California Medical School, San Francisco[1]	Lucile M. Eising	Margery Wagner	d-e	12	Sept	$220[4]	Cert. or Degree
Stanford University, Stanford[1] (Palo Alto)	Wm. Northway	Lucille Daniels	a-b-d[2]	12	Jan June	$523.30	Cert. or Degree
COLORADO							
University of Colorado Medical Center, Denver	Harold Dinken	Mary Lawrence	a-b-d	12	Sept	$300	Cert. or Degree
ILLINOIS							
Northwestern University Medical School, Chicago	John S. Coulter	Gertrude Beard	a-b-d	12	Oct	$450	Cert.
IOWA							
University of Iowa Medical School, Iowa City	W. D. Paul	Olive C. Farr	e	12	Sept	$200	Cert.
KANSAS							
University of Kansas School of Medicine, Kansas City	Donald L. Rose	Lilyan G. Warner & Ruth Monteith	a-b-c[3]	12	Feb Sept	$80[4]	Cert. or Degree
MASSACHUSETTS							
Bouve-Boston School of Physical Education, Boston	Howard Moore	Constance K. Greene	H.S.	36	Sept	$500 yr.	Degree
Simmons College, Boston	Wm. T. Green / Arthur L. Watkins	Janet B. Merrill	a-b-d	16-36	Sept	$550	Cert. or Degree
Boston University College of Physical Education for Women: Sargent College, Cambridge 38	Kenneth Christophe	Adelaide McGarrett	H.S.	36	Sept	$435 yr.	Cert. or Degree
MINNESOTA							
University of Minnesota, Minneapolis[1]	Miland E. Knapp	Ruby M. Green	H.S.	36	Oct	$530[4]	Degree
Mayo Clinic, Rochester	Earl C. Elkins	Helen Belknap	a-b-c	12	Jan July	None	Cert.
MISSOURI							
Washington University School of Medicine, Barnes Hospital, St. Louis[1]	Sedgwick Mead	Beatrice F. Schulz	c	2 yrs	Sept	$400 yr.[5]	Degree
St. Louis University School of Nursing, St. Louis[1]	Alexander J. Kotkis	Sr. Mary Imelda	H.S.	36	Jan Sept	$300	Degree
NEW YORK							
Albany Hospital, Albany	John W. Ghormley	Catherine Graham	a-b-d	12	Sept	$250	Cert.
Columbia University, New York City[1]	Wm. B. Snow	Josephine L. Rathbone	a-b-c	1 or 2 yrs	Sept	$450 yr.	Cert. or Degree
New York University School of Education, New York City[1]	George G. Deaver	Elizabeth C. Addoms	a-b-d	12	Sept	$589	Cert or Degree
NORTH CAROLINA							
Duke University School of Medicine, Durham[1]	Lenox Baker	Helen Kaiser	a-b-d	15	Oct	$300	Cert.
PENNSYLVANIA							
D. T. Watson School of Physical Therapy, Leetsdale[1]	Jessie Wright	Kathryn Kelley	a-b-d	12	Oct	$300	Diploma
Graduate Hospital, University of Pennsylvania, Philadelphia[1]	George M. Piersol	Dorothy Baethke	a-b-e	12	Sept	$300	Cert.
TEXAS							
Hermann Hospital School of Physical Therapy, Houston	Oscar O. Selke, Jr.	Mary Elizabeth Kolb	a-b-d	12	Oct	$300	Cert. or Degree
University of Texas School of Medicine, Galveston	G. W. N. Eggers	Ruby Decker	a-b-d	12	Jan	$163[4]	Cert.
VIRGINIA							
Baruch Center of Physical Medicine of the Medical College of Virginia, Richmond[1]	Walter J. Lee	Susanne Hirt	a-b-c[3]	12	Sept	$351[4]	Cert. or Degree
WISCONSIN							
University of Wisconsin Medical School, Madison[1]	Harry D. Bouman	Margaret Kohli	a-b-c[3]	12	Sept	$120[4]	Cert. or Degree

[a]Courses are so arranged that any of the entrance requirements will qualify students for training. a = Graduation from accredited school of nursing; b = Graduation from accredited school of physical education; c = Two years of college with science courses; d = Three years of college with science courses; e = Baccalaureate degree; H.S. = High School graduation.

[1]Male students are admitted.

[2]High school graduates accepted for a four-year course leading to A.B. degree.

[3]High school graduates accepted for four-year college course.

[4]Nonresidents charged additional fee.

[5]Certificate granted by Children's Hospital Society; degree granted by University of California at Los Angeles.

[6]Tuition reduced second semester of second year.

Editorials

Notices for payment of annual dues for membership in the American Physical Therapy Association have recently been received. This is a good time to review the many services and benefits which are available through the National Office. By 1944 the growth of the Association had increased the duties of the national officers to such an extent that it was necessary to employ an executive secretary and to establish a National Office. This office, headed by the Executive Secretary, conducts all the business of our association as directed by the Executive Committee, which in turn represents the membership. Therefore, the National Office really is our representative and our communicating agent in both a business and professional capacity. It is the liaison for activities carried on by the various departments of our organization and a clearing house for information. We are all aware that we could not have made such rapid and satisfactory growth without having full-time, paid professional workers to carry out our plans for us.

One of the present urgent needs is the training of more physical therapists. The efficiency of many departments is severely handicapped by being understaffed. It is to the interest of all physical therapists to encourage properly qualified, intelligent persons to consider the profession. We are concerned with getting information to young people who are selecting their vocations. Many chapters and individual members are doing excellent work in education and guidance. Much study and planning has been done on the national level to promote vocational education, and material such as leaflets, brochures and exhibits are freely available from the National Office.

Job placement is another valuable service. An attempt is being made to manage it intelligently and to the best interests of both employer and physical therapist. Thus, a member may secure assistance and advice in securing a suitable position.

The field workers in the National Office have the opportunity to obtain the over-all picture of the professional situation throughout the country. With this information they are able to give expert advice, guidance and assistance for chapter problems or projects.

Pertinent professional information and material is formulated, assembled and distributed by your National Office. Also, after the original plans are made, most of the arrangements for the annual conference are made by the National Office staff.

It is impossible to enumerate all the facilities which are available or the services which are rendered by your National Office. You should be acquainted with them and take advantage of them, for through use you will develop appreciation.

Annual Conference of the American Physical Therapy Association

Copley Plaza Hotel, Boston, Massachusetts

JUNE 19-24, 1949

Sunday, June 19

11:00 a. m. "Brunch" School Section

3:00 p. m. Registration

7:30 p. m. Formal opening of 26th Annual Conference—Lois Ransom, President, American Physical Therapy Association

Greetings from: Massachusetts Chapter—Mary MacDonald

Arthur W. Allen, M.D., President-Elect, Massachusetts Medical Society

Vlado A. Getting, M.D., Dr. P.H., Commissioner, Department of Public Health, The Commonwealth of Massachusetts, State House, Boston, Mass.

"New Horizons and New Responsibilities"—Howard A. Rusk, M.D., Director, Institute of Rehabilitation and Physical Medicine, New York University-Bellevue Medical Center, New York, N. Y.

Monday, June 20

9:00-12:00 noon — General Session—House of Delegates
12:00- 2:00 p. m. — Luncheon
2:00- 5:00 p. m. — The Neurological Basis for Treatment of the Hemiplegia
"Methods of Reducing Spasticity in Certain Types of Hemiplegia"—Temple Fay, M.D., Director, Neuro-Physical Rehabilitation Clinic, Philadelphia, Pa.
"The Rehabilitation of the Hemiplegia Patient"—Donald A. Covalt, M.D., Clinical Director, Institute of Rehabilitation and Physical Medicine, New York University-Bellevue Medical Center, New York, N. Y.
5:00- 6:00 p. m. — Meeting of National Chairmen of Standing Committees with Chapter Chairmen
7:30- 9:00 p. m. — Movies

Tuesday, June 21

9:00-12:00 noon — The Neurological Basis for Treatment of Cerebral Palsy
"Neurological Aspects of Cerebral Palsy"—Temple Fay, M.D., Director, Neuro-Physical Rehabilitation Clinic, Philadelphia, Pa.
"Speech Therapy"—Louise Esterer
12:00- 2:00 p. m. — Luncheon
2:00- 5:00 p. m. — General Session—House of Delegates
7:30 p. m. — Banquet (Informal)

Wednesday, June 22

9:00-12:00 noon — Poliomyelitis
"Poliomyelitis"—Thomas Gucker III, M.D., Massachusetts Infantile Paralysis Clinics of Children's Hospital, Boston, Mass.
"Early Care of the Poliomyelitis Patient" Demonstration—Shirley Cogland, Assistant Technical Director, Department of Physical Therapy, Children's Hospital, Boston, Mass.
Theresa Fallon, Consultant, Joint Orthopedic Nursing Advisory Service, New York, N. Y.
12:00- 2:00 p. m. — Luncheon
2:00- 4:00 p. m. — The Neurological Basis for Treatment of Multiple Sclerosis
"Multiple Sclerosis"—Leo Alexander, M.D., Director, Multiple Sclerosis Clinic, Boston, Mass.
7:30- 9:00 p. m. — General Session—House of Delegates

Thursday, June 23

9:00-12:00 noon — "Some Research Problems in Physical Therapy"—Arthur L. Watkins, M.D., Associate in Medicine, Harvard Medical School; Chief of Physical Medicine, Massachusetts General Hospital, Boston, Mass.
Papers on Research—Graduate Students in Physical Therapy Schools—selection of papers to be announced
12:00- 2:00 p. m. — Luncheon
2:00- 5:00 p. m. — Arthritis
"The Nature of Rheumatoid Arthritis"—Walter Bauer, M.D., Massachusetts General Hospital, Boston, Mass.
"Emotional Factors in Rheumatoid Arthritis and Their Bearing on the Care and Rehabilitation of the Patient"—Alfred O. Ludwig
"Physical Therapy in the Treatment of Arthritis"—Mary L. Nesbitt, Supervisor, Physical Therapy Department, Massachusetts General Hospital, Boston, Mass.
7:30 p. m. — Concert—Boston "Pops"

Friday, June 24

9:00-12:00 noon — Clinical Demonstrations
Main Amphitheater, Peter Bent Brigham Hospital
"Fractures"—T. B. Quigley, M.D., Assistant Chief of Surgery, Peter Bent Brigham Hospital, Boston, Mass.
Auditorium—Massachusetts General Hospital
"The Beasley Electronic Myodynamometer"—Arthur L. Watkins, M.D., Associate in Medicine, Harvard Medical School, Chief of Physical Medicine, Massachusetts General Hospital, Boston, Mass.
"De Lorme Exercise Table"—Thomas De Lorme, M.D., Research Fellow, Department of Physical Medicine, Massachusetts General Hospital, Boston, Mass.
12:00- 2:00 p. m. — Luncheon
2:00- 4:00 p. m. — "Open House"—
Boston School of Occupational Therapy (refreshments)
Children's Hospital
Cushing Veterans Administration Hospital
Liberty Mutual Rehabilitation Clinic
Murphy General Hospital
Robert Breck Brigham Hospital (coffee)
Veterans Administration, Boston, Regional Office Outpatient Clinic
Visiting Nurse Association—Health Unit (tea)

Annual Conference

The time is almost here. Have you made your reservation? If not, do so now. Let us have a record turn-out. The program speaks for itself—outstanding speakers on subjects of interest to everyone. The exhibits this year will be a feature. A large exhibit space has been obtained for a greatly increased number of commercial and scientific exhibits. The "Pops" will be a highlight—enjoy good music and good fellowship. Make up a party of both old friends and new ones made at the Conference. The Copley Plaza tells us that at lunch on Tuesday and Friday noon in the Oval Room, Bonwit Teller has a fashion show!

Alumni get-togethers at the Banquet offer another opportunity for reviving old friendships and to meet new fellow alumni.

Do not forget the House of Delegates Session. Every member is *urged* to attend. There will be discussions of great importance to every member which concern you and your profession.

House of Delegates Agenda Annual Session 1949

Presiding: Mary C. Singleton, Speaker

Other Officers:
- Marguerite Irvine, Vice-President
- Mary Haskell, Secretary

Meetings of the House of Delegates:
- Monday, June 20, 9:00 a. m. to 12:00 noon
- Tuesday, June 21, 2:00 p. m. to 5:00 p. m.
- Wednesday, June 22, 7:30 p. m. to 9:00 p. m.

Presentation of credentials by delegates. (All delegates should present credentials to the Secretary of the House of Delegates at 8:30 a. m. so that the meeting may convene promptly at 9:00 o'clock.)

Agenda:
1. Roll call.
2. Appointment of committee to edit the minutes.
3. Acceptance of conference program.
4. Annual reports.
5. Creation of School Section.
6. Report of Nominating Committee.
7. Report of House of Delegates' Committee on Placement.
8. Reports of State Legislation:
   California New York
   Maryland Washington
   To be given by chief delegates of each chapter.
9. Discussion of suggested procedures for the Nominating Committee. (See page 225, this issue.)
10. Chapter projects:
    Development of personnel policies.
    Student membership.
    Territorial jurisdiction.
11. Report of annual Executive Committee meeting.
12. Polio recruitment.
13. Report of status of terms "physical therapist" and "physical therapy technician."
14. Election of director to fill unexpired term.
15. Decision of type and location for conference —1950 and 1951.

Please Note:
1. All Association members are urged to attend the House of Delegates meetings.
2. Voting is done by duly accredited delegates.
3. All delegates are to sit in the *front* of the room at *all meetings.*

Conference Exhibitors

Commercial:
- The Burdick Corporation
- Ille Electric Corporation
- J. H. Emerson Company
- Raytheon Manufacturing Company
- The Ries Corporation
- Reeducational Equipment
- Teca Corporation
- Thermo Electric Company

Scientific:
- Women's Medical Specialist Corps, United States Army
- American Association of Medical Record Librarians
- National Foundation for Infantile Paralysis
- American Occupational Therapy Association
- National Society for Crippled Children and Adults
- Joint Orthopedic Nursing Advisory Service
- American Physical Therapy Association:
  - Eastern Missouri Chapter
  - Illinois Chapter
  - Massachusetts Chapter
  - New York Chapter, Inc.
  - Washington Chapter

Invitations to Those Attending Conference

• The Institute of Rehabilitation and Physical Medicine, 325 East 38th Street, New York City, will have open house for visiting physical therapists on June 15-18 and June 27-30. Edith Buckwold, Director of Rehabilitation Courses for Physical Therapists, is making arrangements. Hours: 10-1, and 2-4.

• An invitation to stop at Hartford en route to or from Boston and the American Physical Therapy Association Conference to visit the Hospital for Chronic Illness at Rocky Hill, Connecticut, has been extended by Nila K. Covalt, M.D., Chief of Physical Medicine and Rehabilitation at the Hospital.

They have established a guide and training program in Physical Medicine and Rehabilitation in approximately 10,000 square feet of working floor space for physical and occupational therapy (10 physical therapists and 7 occupational therapists on duty) and educational vocational therapy.

The hospital is ten miles from Hartford, and Doctor Covalt's invitation states that they will meet anyone at the information booth of the Hartford Railroad Station. Call and they will come, or if you will let them know before you arrive, they will be there.

*Conference Speakers**

Howard A. Rusk, M.D.

Professor and Chairman, Department of Rehabilitation and Physical Medicine, New York University College of Medicine; Chief of Rehabilitation Service at Bellevue Hospital, and Director, New York University-Bellevue Medical Center Institute of Rehabilitation and Physical Medicine; Associate Editor, the *New York Times;* Consultant in medical rehabilitation to (1) Medical Director, Veterans Administration, (2) Secretariat of United Nations and (3) Department of Hospitals, City of New York.

While in military service, Doctor Rusk was Chief, Army Air Forces Convalescent Services Division, Washington, with rank of Colonel; and was awarded the Distinguished Service Medal in 1945.

Prior to military service, Doctor Rusk was engaged in the practice of internal medicine in St. Louis, Mo., where he also was Instructor in Medicine at Washington University and Associate Chief of Staff of St. Luke's Hospital.

Mary E. Nesbitt, B.S.

Supervisor of Physical Therapy, Department of Physical Medicine, Massachusetts General Hospital; Clinical Supervisor and Instructor, Bouve-Boston School of Physical Education, Tufts College affiliate; Clinical Supervisor and Instructor, Simmons College; Clinical Supervisor, Boston University, Sargent College; Instructor, Boston College School of Nursing.

Miss Nesbitt is a graduate of Bouve-Boston School of Physical Education, and the Physical Therapy Course, Harvard Medical School, Courses for Graduates. Previously she has been employed as Physical Social Director, Western Reserve University School of Nursing, Cleveland; Physical Therapist, Shriners Hospital for Crippled Children, St. Louis, Mo., and Rochester General Hospital, Rochester, N. Y., and Head Physical Therapist, University of California Medical Center, San Francisco.

T. B. Quigley, M. D.

Associate in Surgery, Harvard Medical School; Associate in Surgery, Peter Bent Brigham Hospital; Surgeon to the Harvard Athletic Association, and Consultant in Surgery to the Surgeon General, U. S. Army.

Except for two years in special studies in New York and Europe Doctor Quigley's professional life has been principally concerned with the Peter Bent Brigham Hospital and the Harvard Medical School. His basic training was in general surgery and he is certified by the American Board of Surgery. Interests and circumstances led him into the field of trauma which now occupies most of his time. Doctor Quigley served for three and a half years in the European Theater of Operations, first as Chief of the Orthopedic Service of the Fifth General (Harvard) Hospital, and later as Chief of Surgery of the 22nd General Hospital.

Doctor Quigley is a member of the American College of Surgeons, The American Association for the Surgery of Trauma, and the Boston Surgical Society.

*Additional biographies and photographs of conference speakers will appear in the June 1949 issue.

Arthur L. Watkins, M.D.

Associate in Medicine, Harvard Medical School; Co-director of Physical Therapy Program at Simmons College in affiliation with Children's Hospital, Massachusetts General Hospital, and Peter Bent Brigham Hospital; Consultant in Physical Medicine and Rehabilitation, Area 1, Veterans Administration; Consultant in Physical Medicine, U. S. Marine Hospital, Brighton; Consultant in Physical Medicine, Murphy General Hospital, Waltham; Consultant, Boston Psychopathic Hospital and Robert Breck Brigham Hospital; Consultant on Education, Council on Physical Medicine, American Medical Association; Chief of Physical Medicine, Massachusetts General Hospital.

Doctor Watkins was previously Medical Director of the Bouve-Boston School of Physical Education physical therapy course. He is a member of the Boston Society of Psychiatry and Neurology; Boston Orthopedic Club; Second vice-president, American Congress of Physical Medicine; American Society of Physical Medicine; past-president, New England Society of Physical Medicine; member, American Board of Physical Medicine; Editorial Board, Archives of Physical Medicine.

Temple Fay, M.D.

Professor and Head of the Departments of Neurology and Neurosurgery, Temple University School of Medicine; Active Consulting Neurosurgeon to the Philadelphia General Hospital; Consulting Neurologist to the Norristown State Hospital; Consulting Neurosurgeon to the Scranton Hospital; Director, D. J. McCarthy Foundation for Investigation of Nervous and Mental Diseases; Director, Temple University Medical School unit for investigation of malignancy, under the International Cancer Research Foundation grant.

Doctor Fay was previously associated with the University of Pennsylvania School of Medicine. He is the founder of the Harvey Cushing Society; Member of American Neurological Association, American Psychiatric Association, Association for Research in Nervous and Mental Diseases; Fellow of the American College of Surgeons, and Regent of the International College of Surgeons.

Leo Alexander, M.D.

Director of the Neurobiologic Unit, Division of Psychiatric Research, Boston State Hospital, Boston, Massachusetts, and Instructor of Psychiatry, Tufts Medical College.

Doctor Alexander graduated from University of Vienna Medical School in Austria. After serving four years as resident physician at University Hospital, Frankfort, Germany, he became lecturer on psychiatry and neurology at Peiping Union Medical College in China. Later he joined the staff at Harvard Medical School and for seven years did research work and acted as consultant to Boston hospitals.

As a member of the U. S. Army Medical Corps, Doctor Alexander spent four years overseas with the Eighth Air Force and was one of a special task force sent into Germany to secure medical intelligence on German neuropsychiatric practices. He returned to Boston to establish a private practice and to serve as part-time instructor at Tufts College in Psychiatry, but was recalled to duty and appointed consultant to the Secretary of War of the United States during the War Crimes Trials at Nuremberg, Germany.

Doctor Alexander is a member of the American Psychiatric Association, American Neurological Association, American Psychopathological Association, Association for Research in Nervous and Mental Disease, Harvey Cushing Society, Royal Society of Medicine and others.

Donald A. Covalt, M.D.

Clinical Director, New York University of Rehabilitation and Physical Medicine; Associate Professor of Rehabilitation and Physical Medicine, New York University College of Medicine; Visiting Physician in Rehabilitation and Physical Medicine, Bellevue Hospital, Third Division; Consultant for Physical Medicine Rehabilitation Service, Veterans Administration Department of Medicine and Surgery; Consultant in Rehabilitation and Physical Medicine, St. Albans Naval Hospital.

Formerly Doctor Covalt was Assistant Medical Director, Medical Rehabilitation Service, Department of Medicine and Surgery, Veterans Administration, Washington, D. C.; Executive Officer, Convaing Division, Office of the Air Surgeon, Headquarters Army Air Forces, Washington, D. C.; Executive Officer, Convalescent Training Division, Office of the Air Surgeon, Headquarters Army Air Forces, Washington, D. C.; Convalescent Officer, Headquarters Western Technical Training Command, Army Air Forces, and in private practice in Indiana.

Doctor Covalt is a member of the American Society of Physical Medicine, American Board of Physical Medicine, New York Academy of Medicine, and others.

Association Activities

Report of the Nominating Committee

The Nominating Committee, Lucille Daniels, Chairman, presents the following two candidates for the position of director (three-year term):

Louise Bailey, 5528 S. Hyde Park, Chicago, Ill.

Graduate of Harvard Medical Courses for Graduates No. 442, 1937.
Member A.P.T.A. since 1937.
Present chapter affiliation—Illinois.
Previous chapter affiliation—Hawaii.
Association activities—
Chairman, Committee on Relations—Indiana Chapter.
Vice-President and President—Hawaii Chapter.
Present employment—Physical Therapy Consultant, Cerebral Palsy Division of the National Society for Crippled Children and Disabled Adults, Inc.

Miss Bailey was employed in Indiana for five years, first at the James Whitcomb Riley Hospital and later as Chief of the Physical Therapy Division, Services for Crippled Children. In 1944 she attended the three-month course in Cerebral Palsy at the Children's Rehabilitation Institute, Cockeysville, Md., under the direction of Dr. W. M. Phelps. Following this she went to Hawaii as Consultant in Physical Therapy with the Crippled Children's Services, Territorial Department of Health, and returned to the States in her present capacity in May 1948.

Miss Bailey was appointed as a director of the Association by the Executive Committee at the semi-annual meeting in December 1948 to fill Mr. Henshaw's unexpired term.

Agnes P. Snyder, 3001 5th Ave., Richmond, Va.

Graduate of Training Course in Physical Therapy, Walter Reed General Hospital, Washington, D. C., 1933.
Member A.P.T.A. since 1940.
Present chapter affiliation—Virginia.
Previous chapter affiliation—District of Columbia.
Association activities—None.
Present employment—Student at Medical College of Virginia, studying for Master's Degree.

Since graduation Major Snyder has served sixteen years as an Army physical therapist, having been head of departments, Technical Director of the School of Physical Therapy at Ashford General Hospital, and Chief Physical Therapist with the Army in the European Theater.

For Presentation to the House of Delegates

SUGGESTED PROCEDURES FOR THE NOMINATING COMMITTEE

Article X, Section 13, states the duties of the Nominating Committee as follows:

Prepare a list of nominees from those consenting to serve, if elected, for officers and directors of the Association and for two members of the Committee on Nominations, said list to be balloted on at the elections held on even-numbered years.

In order to assist the Nominating Committee in preparing such a list, the Executive Committee makes the following suggestions based on recommendations of last year's Nominating Committee, Harriet Lee, Chairman, Florence Linduff and Janet Osborne.

1. That as much emphasis as possible be placed at conference on the responsibility devolving on each chapter in the matter of submitting suggestions for nominees.
2. That the National Office send out no later than August a prepared form to each chapter requesting suggestions for nominees, these forms to contain appropriate space for the stating of qualifications and previous A. P. T. A. activities of each candidate. (No candidate to be considered without this information.)
3. After 1950 it is suggested that since the Nominating Committee is appointed immediately following any given election of officers, the publicity both in the REVIEW and to the chapters be initiated the following Spring and prior to conference. This would stimulate thinking prior to and during conference where the work of the current Executive Committee and standing committees is presented to the membership. Filing date for candidates then could be earlier, October 1, which would give the Nominating Committee a little longer working period. It is further suggested that when the report is presented in the REVIEW, a summary of each candidate's qualifications be included together with a small picture of the candidate.
4. The completed forms are to be forwarded to the Chairman of the Nominating Committee, in care of the National Office, no later than November 1 in order that the Committee may have sufficient time to obtain further information about the candidate from the membership file in the National Office or from any other available sources.

   Five copies then can be made for the Chairman to distribute to the committee members. Any briefs from the membership file also can be made up (5 copies) as requested.

   In filling out the form all names should be submitted for specific offices with justification

for such selections. (The Nominating Committee may at its discretion nominate a candidate for an office other than the one suggested if in their opinion the individual is better or equally qualified for that office.)

POLICY REGARDING COMPOSITION OF THE EXECUTIVE COMMITTEE

1. Of primary importance are the individual qualifications of a candidate such as qualities of leadership. The committee is concerned with the development of the Association and the profession. Therefore members should have broad vision, the ability to evaluate trends, to translate them into action and to provide effective leadership in its broadest sense.

   In considering candidates for the individual offices it should be borne in mind duties for those particular offices. The President, Vice-President and Speaker of the House of Delegates should have the ability to preside at general meetings and have a knowledge, or acquire a knowledge, of parliamentary procedures.

   The Secretary of the Association is also Secretary of the House of Delegates and thus assists both the President and the Speaker in carrying out their duties.

   The Treasurer, while not required to do bookkeeping, should have a knowledge of figures. The Treasurer is also a member of the Finance Committee which prepares a budget and supervises the expenditure of funds.

2. Of secondary importance are:
   a. To have different fields of activity represented.
   b. Geographical distribution.
3. Consideration of selecting the president from a member of the past Executive Committee because that would mean that the candidate would be informed of current problems and activities and could more effectively provide necessary leadership.
4. Consideration of selection of directors, composed in part of past officers or committee chairmen and in part members new to the Executive Committee who may in this way acquire experience which will qualify them as future officers.

   (Note: It has been the custom in the past to elect the outgoing president to a directorship.)

Proposed Rules of Government: School Section

Purposes: The purposes of the School Section are (1) to consider, discuss and recommend standards relative to admission, curriculum, teaching practices, clinical training and administration for schools of physical therapy approved by the Council on Medical Education and Hospitals of the American Medical Association, (2) to receive for discussion any matters concerning the education of physical therapists, (3) to make recommendations to the Executive Committee and to the Committee on Education of the American Physical Therapy Association.

Membership: The membership of the School Section shall be composed of American Physical Therapy Association members who are directors of professional education, instructors or clinical practice supervisors in the approved schools of physical therapy and who have registered or re-registered as School Section members within a period of two years.

Voting Body: The voting body shall be limited to three members of the School Section from each of the approved schools who officially represent the director of professional education, the instructional staff and the clinical practice supervision staff of that school. If all the voting members to which a school is entitled will not attend a meeting, the director of professional education of the affected school may confer on the voting member(s) attending the meeting the right to the vote(s) of the voting member(s) not attending the meeting or she(he) may appoint a School Section member (or members) as proxy (proxies).

Attendance: The meetings of the School Section are open to any person who is interested in the advancement of physical therapy education. Anyone attending a meeting is privileged to participate in the discussions of the Section.

Officers: The officers of the School Section shall be Chairman, Vice-Chairman and Secretary. Officers shall be elected by ballot following nominations from the floor, immediately following the period of the annual conference at which the School Section is created by the House of Delegates of the American Physical Therapy Association. Thereafter, they shall be elected at the business meeting of the Section held in even-numbered years. At least two of the Section officers shall be elected from among the directors of professional education and one from among the clinical practice supervisors who are not also directors of professional education. Officers shall assume their duties at the close of the annual meeting at which they are elected.

Annual Meeting: An annual meeting of the School Section shall be held during, immediately preceding or immediately following the period of the National Conference of the American Physical Therapy Association, at which time a business meeting shall be held and an educational program presented.

(NOTE: These rules of government will be discussed and voted upon by the school section at its brunch meeting on Sunday, June 19th. Plan to attend now. Reservations should be sent to the National Office by June 1st.)

Personnel Policies for Qualified Physical Therapists

Physical therapy, a medical service given only by medical prescription, includes the employment of therapeutic exercise, massage and the utilization of effective properties of heat, cold, light, water and electricity in the treatment of disease or injury. Specific professional preparation is required to enable the physical therapist to carry out the many treatment procedures and tests prescribed by the physician. The Council on Medical Education and Hospitals of the American Medical Association in recognition of this has established educational standards for physical therapists and approves schools which meet those standards. An employer may be assured that a graduate of a school approved by the Council or a member of the American Physical Therapy Association or a senior registrant of the American Registry of Physical Therapy Technicians is a qualified physical therapist.

The physical therapists, in common with other professional workers, should know when accepting employment what can reasonably be expected in salary and increments according to capabilities and length of service as well as what opportunities there are for professional growth. Conversely the employer must be assured that the prospective physical therapist has the necessary knowledge, experience and skills to carry out the required professional work in any given position—staff, supervisory or teaching.

The American Physical Therapy Association is aware of the variables in living costs in the different sections of the country; that in establishing policies for any given area they must be considered, whether high or low. Base pay, however, must be sufficient for the worker to maintain himself in the community without the necessity of assuming additional work.

Physical therapy is a service for which a fee is usually charged. The department thus becomes self-sustaining and may be income-producing. Most hospital insurance plans provide payment for physical therapy services. Workmen's compensation, official agencies such as Crippled Children's Services, Vocational Rehabilitation, private agencies such as the National Foundation for Infantile Paralysis and state and local societies for crippled children and adults—all pay for physical therapy services for patients under their sponsorship.

The American Physical Therapy Association, in response to requests and in recognition of its responsibilities to members as well as to employers of physical therapists, presents the following recommendations:

SALARY

Staff: The beginning base pay for a staff physical therapist should be no less than $2,640 for a forty-hour week. A plan for annual increments, until maximum for the staff classification has been reached, should be established. Although it is not uncommon to have a range of $400 to $600 in a classification, it is felt that the employer should work this out according to the size of the department and policies of the institution or employing agency for all professional personnel.

Supervisory, Teaching, Special: Other classifications depend on size of the department and the demands for employment of those with additional qualifications for work in specialized fields. The minimum salary for those with additional responsibilities, whether it be in teaching, supervising or in specialized work, should begin above the maximum staff salary and be commensurate with salaries of other professional personnel with similar qualifications and responsibilities.

VACATIONS

A *minimum* of two weeks vacation, with pay, with provision for increase in time according to length of service and responsibilities. Physical therapy is hard work and a generous vacation policy will prove to be good economics.

PROFESSIONAL CONFERENCES

National professional conferences, such as the one held annually by the American Physical Therapy Association, are in effect refresher courses and do provide an opportunity for professional growth of the staff. It would seem advisable that at least one member of the staff attend a conference without loss of vacation time or salary. Some hospitals have arranged to send a supervisor or selected staff member to the conference with all expenses paid and others have given some financial assistance. Frequently these expenses are assumed by one of the voluntary groups, such as a women's board.

The physical therapist attending the conference should be expected to make a report to the medical staff and to share new knowledge with other members of the physical therapy staff.

HOSPITAL INSURANCE, SICK LEAVE, SOCIAL SECURITY

This is not a problem peculiar to physical therapists and it is generally recognized that there should be provision for adequate coverage of these items for all personnel.

NONPROFESSIONAL ASSISTANTS

The employer, to obtain maximum professional physical therapy services, should consider the employment of nonprofessional assistants in the department such as a clerk and an attendant. With the existing shortage of qualified physical therapists it is particularly important that the physical therapist be relieved of clerical and maintenance duties and thus have time to give more professional service to the patients.

CONCLUSION

Although the Association considers it advisable that salary schedules be set up on regional and local levels, employers should be informed of the one national salary scale in effect for physical therapists and other professional workers of similar education and work responsibilities, namely Federal Civil Service. As of July 1948, the salaries are a follows:

P1	$2,974.80	to	$3,727.20
P2	3,727.20	to	4,479.60
P3	4,479.60	to	5,232.00
P4	5,232.00	to	6,235.20
P5	6,235.20	to	7,192.80

These salaries are based on a forty-hour work week. No maintenance is included. Sick leave, vacation time, retirement are of course included in Civil Service Policies.

Qualifications and job description in these categories may be obtained from the U. S. Civil Service Commission.

Physical therapy, as a medical service, requires exacting preparation to successfully administer prescribed treatment. The American Physical Therapy Association presents recommendations for personnel policies to fulfill its responsibilities to physical therapists and employing agencies. The Association recognizes that physical therapists, together with others "who serve the sick have opportunities for service and satisfaction beyond those available to any other of the employed groups."*

*Excerpt from a resolution of policy with respect to relationships between hospitals and employees, American Hospital Association.

Polio Recruitment

On May 1, 1949, the American Physical Therapy Association took over recruitment of physical therapists to work temporarily with infantile paralysis patients in epidemic areas. We are anxious to maintain the same efficient service in supplying physical therapists that the National Foundation for Infantile Paralysis has carried on in the past.

We hope to go beyond this in developing professional and interprofessional relations with emphasis on patient care. Polio Recruitment Service in the National Office will be handled as a separate service but will afford the opportunity to correlate it with other Association activities. Write us your suggestions for making this program effective.

Polio Recruitment Service
American Physical Therapy Association
1790 Broadway
New York 19, N. Y.
Telephone: JUdson 6-2932

Let us know NOW if you will be available for temporary work in infantile paralysis epidemics.

* * * * *

In the July issue of the REVIEW we plan to include several short practical articles relating to physical therapy for infantile paralysis cases. Applicable contributions regarding your past experience with suggestions to other physical therapists will be welcome. They should reach National Office by June 1st.

Charter

It has seemed advisable to withhold the permanent charter until new by-laws of the chapters have been received and approved. This will assure proper listing of name and chapter as well as proper territorial boundaries.

Qualifications for Associate Membership

At the semi-annual meeting it was voted to accept the following qualifications for associate membership in the American Physical Therapy Association:

"Associate members shall be those who have an active interest in physical therapy and the activities of this Association. They shall be licensed physicians, scientists, educators, hospital administrators or members of allied professions such as occupational therapists, nurses, medical social workers, speech therapists or others who have made outstanding contributions in their respective fields."

National Office Notes

• We wish to thank those who answered our request for January-February 1947 copies of the REVIEW. Several of these magazines already have been placed in medical and school libraries, in need of this issue to complete their files.

• Each month the official magazines of our professional colleagues come to the National Office.

We find upon reading them that the nurses, occupational therapists, medical librarians and others have their problems, too, which gives us a sense of kinship.

We also read articles which many of you would find of interest. In the March issue of the American Journal of Nursing there are several. One is on "How to Plan Your Program." All chapter program chairmen should read this. Much of it could be applied to chapter program planning. There is a short article on "What the International Council of Nurses Does." This is of interest because of the proposed International Council of Physical Therapists. There is a very interesting article on "Play for the Hospitalized Child," with suggestions for play materials. The nurses have made a study on "How Long Should Uniform Sleeves Be?" Replies to 100 questionnaires sent to all sections of the United States, Hawaii and Puerto Rico, revealed that more and more graduates are being allowed to choose their own sleeve length. Seventy-five per cent of the nurses questioned preferred the long sleeves. They are interested, however, in a new three-quarter length sleeve. Another article, "Confessions of a Committee Woman," states you can never know until you've tried it, how exciting and satisfying committee work can be!

Membership News

Doctor Mennell Returns to England

It was with regret that we bade Godspeed to Dr. and Mrs. James B. Mennell as they sailed for home May 4th. It is almost two years since Doctor Mennell came to the United States at the invitation of the American Physical Therapy Association and the physical therapy school at Stanford University.

During that time he has given generously of his extensive knowledge and skills to physicians and physical therapists throughout the country. Doctor Mennell is a great man and a great physician. His wisdom, kindness and philosophy have been an inspiration to all who were privileged to attend his classes. We are proud that he is returning to England wearing the gold key symbolic of his honorary membership in the American Physical Therapy Association presented to him at Asilomar, July 1947. The best wishes of the Association are extended to Dr. and Mrs. Mennell and we hope that they will visit us again soon.

Personals

• Mrs. Mary E. Snook of Tigard, Oregon, entered and won the "wishbone" contest sponsored by the Poultry and Egg National Board. This involved submitting a 75 word essay on why she "eats chicken every Sunday," a wishbone, and a wish. The prize was $1,000 cash. Her wish was "to go east to study the treatment of cerebral palsy." She plans to go to the Children's Rehabilitation Institute in June.

Mrs. Anna M. Elliott, nee Orr, graduate of Reed College emergency physical therapy course for Reconstruction Aides and Harvard Medical School courses for graduates #442, died in Portland, Oregon, March 14, 1949, after an illness of three months.

Mrs. Elliott was a charter member of the Association and an active supporter of all its activities. She was a member of the Oregon Chapter and served as its secretary in 1943-45.

Bertha Neumeier died October 8, 1948, following surgery. She was a graduate of the D. T. Watson School in 1945, and a member of the Association and the Western Pennsylvania Chapter from that time. She was employed at the St. Frances Hospital and was held in high esteem by the entire staff.

Marriages:

Karen Foss of San Francisco, California, is now Mrs. Karen Barfod.

Helen Frances Forney of Raleigh, North Carolina, is now Mrs. Helen Knight.

Sylvia Moldaw of Brooklyn, New York, is now Mrs. Sylvia Manaster.

Esther Neely of South Laguna, California, is now Mrs. Esther Knorr.

Florence Wrisley of Rochester, New York, is now Mrs. Florence Kalmbacher.

Ann Hogan of Detroit, Michigan, is now Mrs. Ann Revyn.

Evelyn Kolb of Rochester, New York, is now Mrs. Evelyn Levy.

Madeleine Connolly of Philadelphia, Pennsylvania, is now Mrs. Madeleine Porta.

Elizabeth M. Brooks of San Francisco, California, is now Mrs. Elizabeth Stevenson.

M. Patricia Anderson of St. Louis, Missouri, is now Mrs. M. Patricia Stokely.

1st Lt. Miriam Partridge of Augusta, Georgia, is now Mrs. Miriam Keels.

Ernestine Botts of San Francisco, California, is now Mrs. Ernestine Crestfield.

Elayne Goldman of Buffalo, New York, is now Mrs. Elayne Wels.

Doris K. Allen of Torrance, California, is now Mrs. Doris Spoonemore.

Chapter Activities

• *Kansas Chapter:* The Kansas Chapter held its March meeting at the Wadsworth Veterans Hospital. Invited guests were members of the Kansas Occupational Therapy Association, members of the Wadsworth staff, and members of the Missouri Chapter. After a short business meeting a very interesting and instructive program of chest surgery exercises was presented by members of the staff at Wadsworth. Barbara Johnson talked on exercise routines, preoperative and postoperative for lobectomies. Miriam Hobbs talked on exercise routines preoperative and postoperative for thoracoplasties. Demonstration of these exercises was given by Mrs. Patricia Krueger. The complete progressive relaxation exercise routine was presented by Vern Reynolds.

New Members

• The following are newly accepted members of the American Physical Therapy Association:

Jean H. Butkus
Olga Gallan
Lt. Dorothea A. Gee
Elaine Groat
Mrs. Margaret G. Hogan
Lt. Elizabeth Daiber Khul
Jean Middleton
Kathleen A. Stewart

• Recent graduates and former student members of the following schools:

Baruch Center of Physical Medicine, Medical College of Virginia:
Hallie Marguerite Clark

Duke University School of Medicine:
Helen High

D. T. Watson School of Physical Therapy:
John I. Mann

Hermann Hospital:
Gladys P. Swayze

Stanford University:
James Mason Gray

University of Kansas:
Phyllis Ann Oliver

University of Southern California:
Jean A. Graham
Winifred Hall

General News

James C. Elsom, M.D., Professor Emeritus of Physical Medicine and Physical Education at the University of Wisconsin, died on April 11, 1949.

F. Wilson Ille, pioneer in the field of hydromassage and prominent manufacturer of underwater therapy equipment, died of a heart attack on March 22, 1949, at his home, 67 Rocky Wood Road, Manhasset, New York. He was born at Ilion, N. Y., 69 years ago.

Since his early life he was associated with manufacturers of electromedical equipment.

In 1918 he organized his own company, and in 1922 incorporated the present firm, the Ille Electric Corporation. He created the modern hydromassage method of underwater treatment, and developed new electromechanical equipment in this field for the aftercare of poliomyelitis victims, crippled children and wounded war veterans. He devoted his life's work to this cause and became the outstanding manufacturer in this line.

South Carolina Orthopedic Camps

There is an opportunity for a physical therapist of the Negro race to go to the Orthopedic Camp for Crippled Children, June 22 to August 27. Write to Emily H. Cate, Physical Therapy Consultant, State Board of Health, Columbus 10, South Carolina.

Pennsylvania Academy of Physical Medicine

Dr. H. L. Rudolph, Secretary of the Pennsylvania Academy of Physical Medicine, has sent in the following resolution:

WHEREAS, the introduction of Pennsylvania legislature bill S-221 proposing to establish a State Board of Massage has been thoroughly discussed and found to be an attempt by unqualified groups to circumvent laws already regulating adequately the practice of physical therapy in the State of Pennsylvania.

WHEREAS, any attempt to lower the standards and prerequisite qualifications can reflect naught but discredit on the high calibre of physical medicine practiced in this state, and

WHEREAS, pasage of this bill S-221 would prove

inimical to the best interests of the public and the medical profession in general, be it

RESOLVED, that the Pennsylvania Academy of Physical Medicine in session February 17, 1949, at the Philadelphia County Medical Society Building, is unalterably opposed to this bill, and be it further

RESOLVED, that due notice of this action be given widest circulation throughout the state and that all members of the medical profession of Pennsylvania be urged to express their opposition to bill S-221 to their respective representatives at Harrisburg.

Index to Current Literature

Anterior Poliomyelitis

Physical Treatment of Poliomyelitis. Robert L. Bennett. J.A.M.A., April 16, 1949.

Arthritis and Rheumatism

Primer on the Rheumatic Diseases. Prepared by Committee of American Rheumatism Association. J.A.M.A., April 16, 1949.

Diathermy

The Destruction of Retinal Angiomas by Diathermy. Philip M. Lewis. J. Tenn. State Med. Assoc., March 1949.

Foot Conditions

Physical Treatment of Disorders of the Feet. Frances Baker. J.A.M.A., April 16, 1949.

Metatarsus Varus in School Children. I. MacIntosh. Physiotherapy, March 1949.

Low Back Conditions

Physical Treatment of Backache. Frederic J. Kottke. J.A.M.A, April 16, 1949.

Miscellaneous

Therapeutic Possibilities of Microwaves: Experimental and Clinical Investigation. Khalil G. Wakim, J. F. Herrick, Gordon M. Martin and Frank H. Krusen. J.A.M.A., April 9, 1949.

Play for the Hospitalized Child. E. Rita Davidson. Amer. J. Nurs., March 1949.

Nursing Care Following Laryngectomy. Hayes Martin and Harry E. Ehrlich. Amer. J. Nurs., March 1949.

How to Plan Your Program. Amer. J. Nurs., March 1949.

What Is the Hill-Burton Act Accomplishing for Hospitals? Hospital Management, March 1949.

Without Counterpart in Industry, Seven Special Problems in Hospital Personnel Management that Require Tailor-made Programs. David Littauer and Mitchell M. Waife. Hospitals, April 1949.

Fundamentals of Electromyography. John W. Patrick. J. Canad. Physio. Assoc., March 1949.

Helping the Handicapped. Margaret Peterson. J. Canad. Physio. Assoc., March 1949.

What the International Council of Nurses Does. Amer. J. Nurs., March 1949.

Restoration of Grasping Function Following Loss of All Five Digits. Bradford Cannon, Walter C. Graham and James Barrett Brown. Surgery, March 1949.

Vitamin D Intoxication Due to Ertron: Report of Two Cases. Charles K. Donegan, Addison L. Messer and Edward S. Orgain. Annals of Int. Med., February 1949.

Physiotherapy at Morris Memorial Hospital. Doris E. Newall. J. Canad. Physio. Assoc., March 1949.

Peripheral Vascular Diseases

Physical Treatment of Peripheral Vascular Disease. Sedgwick Mead. J.A.M.A, April 16, 1949.

Rehabilitation

Rehabilitation of the Injured. H. Osmond-Clarke. Physiotherapy, March 1949.

Rehabilitation at Egham. A. C. C. MacRae. Physiotherapy, March 1949.

Speech

Speech Rehabilitation Following Laryngectomy. James S. Greene. Amer. J. Nurs., March 1949.

Ultraviolet Radiation

Management of Common Occupational Skin Diseases. Nelson Paul Anderson. J.A.M.A., April 2, 1949.

Coming Meetings

Date	*Organization*	*Place*
June 19-23	American Physical Therapy Association	Copley Plaza Hotel, Boston, Mass.
Aug. 23-27	American Occupational Therapy Association	Book-Cadillac Hotel, Detroit, Mich.
Sept. 6-10	American Congress of Physical Medicine	Netherland Plaza Hotel, Cincinnati, Ohio
Nov. 7-9	National Society for Crippled Children and Adults	Commodore Hotel, New York, N. Y.

Abstracts

John S. Coulter, M.D.

Primer on the Rheumatic Diseases: Part I

Prepared by a Committee of the American Rheumatism Association. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 139:16:1068, April 16, 1949.

Introduction

This is the third edition of the Primer. The first was published by the American Committee for the Control of Rheumatism in 1934 in cooperation with the Committee on Scientific Exhibit of the American Medical Association. A second edition, devoted only to arthritis, was published in 1942 by a committee of the American Rheumatism Association, the latter organization having meanwhile succeeded the American Committee for the Control of Rheumatism. Now advances in knowledge of the rheumatic diseases necessitate this third edition, which is brought out at this time especially in connection with the Seventh International Congress on Rheumatic Diseases to be held in New York City from May 30 to June 3, 1949.

Scope of the Primer

This edition is concerned with the rheumatic diseases in general. As in the case of the previous Primers, its purpose is to present its subject matter as simply and briefly as is consistent with adequate coverage and to present it from the point of view of the general physician rather than that of the specialist.

The term "rheumatism" as employed here includes that large and rather miscellaneous group of diseases and disorders of the supporting tissues which are of concern to the American Rheumatism Association; namely, rheumatic fever, the various forms of arthritis and the large group of less clearly defined disorders such as fibrositis, myositis, bursitis, neuritis and neuralgia. It is not intended to include the structural defects of the bones and joints which are the primary concern of the orthopedic surgeon, although many of these are listed in the classification for the sake of completeness.

Incidence of Rheumatic Diseases

In 1938 the United States Public Health Service reported a survey of the calculated incidence of a large number of diseases in the United States. The results revealed that the rheumatic diseases are the most common cause of chronic illness and that they disable each year ten times as many persons as diabetes and tuberculosis, seven times as many as cancer and twice as many as heart diseases. Furthermore, the rheumatic diseases enumerated in the survey included arthritis, gout, neuralgias, neuritis, lumbago and the like, but did not include rheumatic heart diseases. Hence, if corrected for the latter, the incidence would have been found even higher.

It is obvious that a group of diseases having the numerical and economic importance of those with which we are dealing demands an organized effort to combat it.

Just before the entry of this country into the second world war, a committee of the American Rheumatism Association was appointed to study the possibility of undertaking a national fund-raising effort to support research and teaching and the care of patients with rheumatic diseases. This important undertaking was delayed by the outbreak of hostilities, but since the end of the war rapid progress has been made. Under the sponsorship of the American Rheumatism Association, a separate organization, the Arthritis and Rheumatism Foundation, has been founded with a board composed of physicians and influential laymen and with the purpose of organizing the essential appeal for funds on both a national and a local basis. At the same time, the National Research Council has established a committee on the rheumatic diseases, at the request of the American Rheumatism Association, which is making a survey of facilities for patient care, research and teaching and which will evaluate applications for grants in aid of research as the foundation acquires the necessary funds. Thus, at long last, a national program has been inaugurated which can make an organized attack on this serious group of diseases which afflicts so many millions of persons and causes such a vast economic loss to the nation.

Classification

Rheumatic diseases may be roughly divided into rheumatic fever, arthritis and the periarticular and nonarticular forms of "rheumatism" such as fibrositis, bursitis and myositis.

The majority of cases fall into seven important groups: (1) arthritis due to known microbial agents, (2) the arthritis of rheumatic fever, (3) rheumatoid arthritis, (4) degenerative joint disease, (5) arthritis due to direct trauma, (6) arthritis of gout and (7) the nonarticular forms of rheumatism. No classification of diseases can be entirely satisfactory while the etiology of many of those diseases remains unknown. That shown in the accompanying table is admittedly imperfect, but it has the great merit that it has been adopted as official by both the American Rheumatism Association and the Standard Nomenclature of Disease, and much confusion in terminology will be avoided by its use.

These various forms of rheumatic diseases are discussed later; hence only a few comments will be given here:

(1) Rheumatoid arthritis. Under this heading are included certain diseases which are thought to be merely variants of classic rheumatoid arthritis, such as Still's disease, Marie-Strumpell or ankylosing spondylitis and arthritis associated with psoriasis. Hence these should be listed as rheumatoid arthritis, but, because the relationship is not established with certainty, the other name should be added in parenthesis.

(2) Degenerative joint disease. It is now accepted that this is a process related to advancing age and "wear and tear." Hence it occurs in multiple joints with greater or lesser symptoms in all persons who live long enough. The complete explanation of this form is still lacking, however; hence in the above-mentioned table it is noted as "due to unknown cause." Other cases, however, occur in younger persons and usually involve only one or two joints. Careful history and examination usually will reveal one of three predisposing causes in such cases which hastened the wear and tear in those particular joints. These are (1) congenital defects, (2) previous important injury or (3) previous arthritis of other types. In these instances the predisposing cause should be noted in the diagnosis, as, for example, "degenerative joint disease of right knee secondary to old intracapsular fracture."

(3) The term "mixed arthritis" is to be avoided. When employed in the past it usually has been applied to patients who show evidences of both rheumatoid arthritis and degenerative joint disease. A preferable diagnosis in such cases is "rheumatoid arthritis" if that is the cause of the major disability or, rarely, "degenerative joint disease secondary to inactive rheumatoid arthritis" if the latter disease, as such, contributes little to the disability.

Scoliosis and Cardiac Failure

W. T. Hill, M.D., Cleveland, Ohio. In AMERICAN HEART JOURNAL, 37:3:435, March 1949.

How deformity of the chest results in pulmonocardiac failure is not fully understood, but there is much to indicate that reduction of thoracic volume and faulty respiratory mechanics are chiefly responsible. The size of the lungs is limited by the small thoracic volume, and their effective size is further reduced by atelectasis and emphysema. To this static handicap is added the limitation of respiratory movement resulting from skeletal deformity and from weakness and poor mechanical effectiveness of the muscles of respiration.

Deficiencies in thoracic volume and respiratory excursion may have numerous secondary effects. The smaller size of the lungs reduces absolutely both the amount of air and blood which they can contain and the area of the interface where exchange of gases between air and blood can occur. Diminished respiratory excursion limits the normal inspiratory increase in the capacity of the lungs for air and blood and the normal increase in area of the interface. The increased breathing effort exerted in overcoming mechanical handicaps and maintaining gaseous exchange accounts for the characteristic dyspnea of severely scoliotic patients.

Effects of Implanted Metals on Tissue Hyperthermia Produced by Microwaves

Barbara L. Feucht, R.P.T., M.S., A. W. Richardson, M.S., and H. M. Hines, Ph.D., Iowa City, Iowa. In ARCHIVES OF PHYSICAL MEDICINE, 30:3:164, March 1949.

(1) Under the conditions described in this report, irradiation with 12.25 cm. microwaves caused a greater increase in temperature in tissue containing metal implants than in control tissue.

(2) The increase in temperature was of sufficient magnitude to cause gross damage in the tissue contiguous to the metal and between the metal plate and the surface of the tissue.

(3) When implanted close to the surface, large metal plates caused greater heating than small ones.

(4) The temperature increases were greater when the metal plates were implanted closer to the surface. The increase became less as the depth of implantation became greater.

(5) The effects of metal implants depended upon depth of implant and upon the relationship of the size of the foreign body to the wavelength in tissue.

(6) With careful use, it seems likely that during microwave irradiation there is little danger of burning a patient who either had metal implanted or metal imbedded in tissue. In most instances the metal is not as large or as close to the surface as described in this report. However, the physical therapist should be cautious in the application of microwave diathermy to tissue containing metal implants.

Therapeutic Possibilities of Microwaves: Experimental and Clinical Investigation

Khalil G. Wakim, M.D., J. F. Herrick, Ph.D., Gordon M. Martin, M.D., and Frank H. Krusen, M.D., Rochester, Minn. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 139:15:989, April 9, 1949.

Comment

In any discussion of microwaves certain questions arise that should be answered before final conclusions can be drawn: (1) What possible changes other than heating may result from exposure to microwave? (2) How high may the temperatures of the deep tissues be raised without causing damage to the superficial tissues? (3) Can deep tissues be damaged by microwave heating without the physician's or patient's being aware of destructive action? (4) Is there selective absorption of microwave radiations with resultant differences in heating of various tissues such as bone, the eyes, teeth, moist skin, dry skin, nerve trunks, edematous tissues, hematomas or abscesses? (5) What will be the result of applying microwaves over tissue containing metallic or other foreign objects?

Conclusions

Microwaves are apparently a safe, convenient and comfortable form of heating for local application to tissues. In both dogs and normal human beings microwave radiations will increase the circulation through the irradiated area. Microwave directors are not as yet available for heating very large areas of the body.

Microwaves may be contraindicated or at least should be used with caution over tissues with impaired circulation, over tissues with high fluid content, over regions containing metallic implants and over areas with hemorrhagic tendencies.

Much more careful investigative work must be done with microwave energy before we shall be certain of its rightful place in the field of physical medicine. Although our investigations to date indicate that microwaves have considerable promise, clinically they should be used with caution and reservations.

Hair and Scalp Treatments and Preparations

A Report from the Committee on Cosmetics. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 139:13:840, March 26, 1949.

Massage.—The hair "tonics" usually are applied with massage, which is claimed to increase the circulation, thereby stimulating cell activity and, consequently, favorably influencing the growth of hair. There is no proof that the temporary increase in blood supply to the area massaged postpones the loss of hair or in any other way influences baldness. One firm suggests the massaging of only certain areas of the scalp, supposedly at those sites where the larger blood vessels enter the scalp. Another suggests massaging with the head lower than the waist. In addition to the fact that there is no scientific basis for these theories, over a period of years actual use has proved their worthlessness.

Other firms employ mechanical devices such as electric brushes, vibrators or a suction apparatus for the purpose of increasing circulation. The failures are the same as with manual massage.

In rare instances, continued massage may produce a fine colorless fuzzy down similar to that seen on the heads of some newborn babies. Alert firms are quick to capitalize on this fact by advising their patrons to observe the condition of their scalps under a bright light for the presence of this fuzz on the theory that this is the beginning of a real growth of hair. This fuzz cannot be considered either in length or appearance to be a real growth of hair or a precursor. Frequently, after reaching a length of about ½ inch (1.27 cm.) the fuzz drops off and is not replaced. In any event, its appearance is without cosmetic value, since it is invisible except on close, well-lighted inspection.

Ultraviolet Rays.—No matter how illogical or unscientific the basic principles, any new treatment which has public appeal and which has any degree of practicality eventually will be tried in the treatment of baldness. Therefore, ultraviolet lamps enjoy some popularity. In trained hands, ultraviolet rays have some usefulness, but only those whose scientific background makes them capable of understanding the limited available data and the potential health hazards should undertake the supervision of such treatments.

Reaction of the Body to Poliomyelitis and the Recovery Process

Arthur C. Buyton, M.D., University, Miss. In ARCHIVES OF INTERNAL MEDICINE, 83:1:27, January 1949.

1. The established principles regarding the etiology, pathogenesis and pathology of poliomyelitis have been briefly presented.

2. Relation of the pathologic physiology to symptoms has been more thoroughly discussed, and personal experience as a patient with poliomyelitis has been invoked in explaining several poorly understood symptoms. It is postulated that the pain, tenderness and muscle shortening probably are due to a generalized vasospastic condition secondary to lesions in the medulla.

3. The process of recovery is discussed, with particular emphasis on the arborization of peripheral nerves.

4. A regimen of treatment based on physiologic concepts of the disease has been briefly presented.

Activation of Human Nerves by Hyperventilation and Hypocalcemia: Neurologic Mechanism of Symptoms of Irritation In Tetany

Eric Kugelberg, M.D., Stockholm, Sweden. In ARCHIVES OF NEUROLOGY AND PSYCHIATRY, 60:2:153, August 1948.

In a series of 14 cases of the bulbar type of acute poliomyelitis in which autopsy was performed, hemorrhagic lesions were observed to be common, both grossly and histologically.

Such hemorrhages associated with acute poliomyelitis are considered to be unrelated to the basic degenerative and inflammatory process in this disease.

The hemorrhages are believed to be a terminal phenomenon, resulting from extreme venous dilatation produced by a combination of factors: (a) the peculiar anatomic relations of the vertebral venous system, favoring stasis; (b) the force of gravity; (c) anoxia, and (d) injury to the walls of veins produced by degenerated products of the brain. An additional factor is postmortem manipulation.

The Human Electromyogram in Response to Nerve Stimulation and the Conduction Velocity of Motor Axons: Studies on Normal and on Injured Peripheral Nerves

Robert Hodes, Ph.D., and M. G. Larrabee, Ph.D., Philadelphia, and W. German, M.D., New Haven, Conn. In ARCHIVES OF NEUROLOGY AND PSYCHIATRY, 60:4:340, October 1948.

Muscle action potentials in response to supramaximal percutaneous stimulation of various nerves were recorded in a number of normal subjects, in patients with peripheral nerve injuries and in a few persons with a condition diagnosed as hysterical paralysis. The potentials were recorded through small electrodes on the skin. Convenient electrodes and supports were devised for recording from all the major muscle groups in the forearm, hand, leg and foot. Control observations were made to determine the limitations of the method, particularly those due to the wide spread of the action potential of each muscle. Decrease in amplitude of the action potential after nerve injury indicated decrease in the number of muscle fibers innervated, while increase in latency of the response indicated slowing of the conduction velocity of the regenerating nerve fibers and, therefore, a decrease in axonal diameter.

After nerve suture, muscle action potentials in response to stimulation of the nerve were first detectable at a time which depended on the distance from the lesion to the muscle. The values indicated rates of regeneration in good agreement with the commonly accepted rates of 1 to 2 mm. per day. In general, reinnervation could be detected before an action potential could be recognized by watching for movement during a voluntary effort of the patient.

For the later stages of recovery, it was convenient to plot the percentage of the normal amplitude of action potential against the number of months allowed for recovery divided by the distance from the lesion to the muscle. Against this abscissa, recovery was found to occur at more or less comparable rates in various sutured nerves. In comparison, those nerves which did not require operation recovered their function at a wide variety of rates, often much more rapidly than after the most favorable suture. By comparison with data such as these, it should be possible to tell whether recovery is lagging unduly in any case of peripheral nerve injury in which a similar electromyographic examination is made.

In cases of hysteria or malingering the normality of the peripheral nerve and muscle could be definitely demonstrated.

Current Poliomyelitis Research

Hart E. Van Riper, M.D., New York, N. Y. In DELAWARE STATE MEDICAL JOURNAL, 21:2:29, February 1949.

The principal danger to life is from complications occurring in the acute disease. These usually are respiratory difficulties. We have learned much about dealing with them, and the mortality has been reduced by such measures. We can help the patient to make effective use of nerves and muscles that are left intact. In some degree we can forestall or correct deformities. In these limited fields our technics have been greatly improved. We have provided equipment, trained personnel, and an organization for mobilizing these resources to best advantage.

We cannot, however, repair the damage done by the virus in the central nervous system. There is no convincing evidence that any therapy now available will check or prevent it.

In a disease as variable in its clinical course as poliomyelitis is, the evaluation of any therapy is a difficult task. To be of any statistical value, the series of cases treated must be large. But this is not the only requirement. The test must be made under conditions that will allow a valid comparison between two groups, treated and untreated, but otherwise similar. In attempting such a comparison we must remember that the disease varies in severity not only from case to case but from one outbreak to another. We probably cannot, in dealing with human patients, set up such rigid controls as any biologist would consider necessary in a similar experiment on animals, but we should conform to the ideal as nearly as possible, and in proportion as we fall short of it we should be cautious in drawing conclusions.

Research is being directed toward methods of prevention as well as treatment. One approach is to trace the life history, distribution and means of spread of the virus, in the hope that sources of infection can be eliminated. We know the virus multiplies in the human body, but have found no evidence that it does so anywhere else under natural conditions. Virus is given off from the infected human body mainly by way of the bowel. While it may be present in nasopharyngeal secretions, there is little direct evidence that significant amounts of it escape by way of the mouth or nose. It can survive outside the body for long periods of time, but we do not know how it is transmitted from person to person. There frequently is a history of contact with some recognized case. But even if infection does result from contact, we still do not know the precise mode of transfer of the virus. The word "contact" covers a variety of situations, with an equal variety of possible agencies of transfer. Flies are known to be occasional carriers of virus, but we do not know how many human infections, if any, can be attributed to them.

We are continuing to study the means by which virus is

disseminated and the media from which infection occurs. That is necessary for a complete understanding of the disease.

The second possible method of prevention is to increase individual resistance to infection, either by vaccination or by some other form of prophylaxis.

The virus of poliomyelitis is one of the most difficult of all pathogenic agents to handle in the laboratory. That is because of its peculiar choice of host animals, which we cannot change. We are constantly seeking simpler technics, and we have learned a great deal even with the cumbersome methods available to us. It is difficult to fit all our present facts into a logical pattern, but that situation has recurred repeatedly, and been resolved, in the history of other diseases. From our experience with them we may confidently predict that poliomyelitis eventually will be conquered.

The Role of the Sympathetic Nervous System in Acute Poliomyelitis: Preliminary Report

Emil Smith, M.D., Philip Rosenblatt, M.D., and Andrew B. Limauro, M.D., Brooklyn, N. Y. In THE JOURNAL OF PEDIATRICS, 34:1:1, January 1949.

The authors have presented clinical evidence showing that sympathetic nervous system involvement in acute poliomyelitis may manifest itself in the cervical region by Horner's Syndrome, in the thoracic region by spasm of the pulmonary blood vessels with dilatation and irregularity of the right side of the heart, in the gastric region by pylorospasm, in the intestinal region by constipation or diarrhea, in the rectal region by intestinal obstruction, in the bladder region by retention or incontinence of urine and in the skin by angioparesis or spasm.

Presumptive evidence has been presented to show that the blood vessels in the chronic poliomyelitic extremity behave and respond similar to the angiospasm of Raynaud's disease or the cramplike pain in intermittent peripheral arterial claudication.

The authors have demonstrated that short wave diathermy with the rhythmic constrictor dilated the blood vessels and increased the blood supply to the extremity. The muscles relaxed and the pain diminished or subsided only to return when the blood vessels contracted.

However, they feel that neither short wave diathermy nor hot packs are the solution for the relief of the muscle spasm and pain in acute poliomyelitis, since these methods do not produce sustained vasodilatation. The method of choice would be a drug that could be administered by mouth, subcutaneously, or by the intravenous route.

They fully understand that the subject matter in this paper is debatable. However, they hope that it will provoke others to investigate further the role of the sympathetic nervous system in acute poliomyelitis, and that it will eventually lead to a better understanding of the clinical picture of the disease and hence to a more scientific therapeutic approach.

Activation of Human Nerves by Ischemia: Trousseau's Phenomenon in Tetany

Eric Kugelberg, M.D., Stockholm, Sweden. In ARCHIVES OF NEUROLOGY AND PSYCHIATRY, 60:2:140, August 1948.

Symptoms of excitation induced with ischemia (compression with a pneumatic cuff) were studied on the human arm in cases of latent tetany caused by forced respiration and hypocalcemia.

1. The Trousseau sign, or the spasm, is due to ischemic activation, first and foremost, of the proximal part of the longest motor nerve fibers. The electromyographic picture of the spasm is described. The double spikes elicited in this manner are found to be due to an iterative response in the same nerve fiber. The clinical importance of observing the tactile paresthesia in connection with the elicitation of the Trousseau phenomenon is stressed.

2. In the ulnar nerve, ischemia activates the A nerve fibers according to their threshold for an iterative response to a slowly rising or constant current. The motor discharge elicited by ischemic activation is, in certain respects, identical with that evoked by a slowly rising current. The activity usually starts with a unit of small amplitude, followed by units of progressively larger spikes. The units recruited are often the same, and the frequencies of discharge are likewise similar.

3. The distribution and order of activation of different tactile and motor fibers in the arm in ischemia correspond well with these factors in ischemic paralysis. The longer tactile fibers, the longer motor fibers, the shorter tactile fibers, the extensor motor fibers and the flexor motor fibers are activated and paralyzed, in the order of enumeration.

These facts are briefly discussed in relation to certain clinical symptoms of irritation and paralysis due to cerebral circulatory disturbances indicating that the characteristics of the different fibers at the periphery are retained in the central pathways.

Electrodiagnosis of Lesions of Peripheral Nerves in Man

Lewis J. Pollock, M.D., James G. Golseth, M. D., Frank Mayfield, M.D., and Alex J. Arieff, M. D., Chicago, and Capt. Y. T. Oester, M.C., U.S.A. In ARCHIVES OF NEUROLOGY AND PSYCHIATRY, 60:1:1, July 1948.

Since World War I, no new or additional methods of stimulating nerve or the nerve-muscle complex have been discovered. However, there has been developed apparatus by means of which accurate measurement of the amperage and duration of currents which are passed through muscles may be made, and, in fact, predetermined; the wave form and periodicity of current desired are made possible by electronic devices, and artefacts due to changes in resistance of the tissue are obviated.

The authors describe the characteristics of the response of muscle to all the stimuli which were studied. Thus they were enabled to define a formula for each of the states of muscle studied: normal, degenerating, denervated, regenerating and recovered states, and unsatisfactory or minimal neurotization, including spontaneous regeneration.

Effect of Muscular Exercise on Dark Adaptation

John P. Wendland, M.D., Minneapolis, Minnesota. In AMERICAL JOURNAL OF OPHTHALMOLOGY, 31:11:1429, November 1948.

Twenty-nine subjects were used, on whom 60 tests were performed, in studying the effect of light and heavy muscular exercise upon both the rate and final rod threshold of dark adaptation.

Light exercise has essentially no effect upon the rate of dark adaptation and only a tendency to produce a slight biphasic response in the rod threshold. For practical purposes it may be said to exert no effect on dark adaptation.

Heavy exercise produces a tendency to elevation of the thresholds of the total dark-adaptation curve and causes a marked biphasic response in final rod thresholds. The biphasic response consists in, first, a lowering of the threshold of short duration, followed by a rise in the threshold, often of considerable magnitude and of longer duration. In one subject, the depression of sensitivity was equal to that produced in an individual at an altitude of 15,000 feet. In practical application, heavy exercise may be said to produce a definite decrease in ability to see at night.

The factors responsible for these observations have been discussed and the importance of the changes in critical visual tasks performed at night pointed out.

Ruptures of Muscles and Tendons: With Particular Reference to Rupture (or Elongation of Long Tendon) of Biceps Brachii With Report of Fifty Cases

Richey L. Waugh, M.D., Thomas A. Hathcock, M.D., and J. Elliott, M.D., Boston, Mass. In SURGERY, 25:3:370, March 1949.

(1) The subject of ruptures of muscles and tendons, with particular reference to rupture of the biceps brachii, is reviewed and discussed together with a report of 50 cases of rupture of the biceps brachii personally observed during a fourteen-year period.

(2) Ruptures of the biceps brachii often go unrecognized and untreated. This is due to the fact that many general practitioners and surgeons are not familiar with the condition. Mistaken diagnoses include conditions such as strain or sprain of shoulder, rupture of supraspinatus tendon, subdeltoid bursitis, arthritis, periarthritis, neuritis, and rupture of blood vessels.

(3) The increasing frequency of occurrence or rather diagnosis is due to the continued "biceps mindedness" in the diagnosis of shoulder conditions by our resident staff.

(4) The 50 cases of rupture of biceps brachii include ruptures of the long tendon, ruptures at the musculotendinous junction, and ruptures (avulsion) of the distal tendon.

(5) Twenty-nine of the 50 patients with rupture of the biceps brachii were subjected to operation. The results following operation were very satisfactory in all but one case.

(6) The character of treatment depends upon the degree and site of the rupture and the age and occupation of the patient. However, in most instances operation is the method of choice. The various types of operation for ruptures of the biceps brachii are discussed in detail.

Physical Treatment of Backache

Frederic J. Kottke, M.D., Minneapolis. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 139:16:1055, April 16, 1949.

Pain low in the back is a common reason for patients to seek medical aid. Many backaches may be diagnosed roentgenologically as resulting from congenital anomalies, bony deformities, traumatic injuries to bone, arthritic changes, metastatic tumors or, occasionally, metabolic changes. In patients with such disorders the treatment prescribed depends on the pathologic changes found. However, there is a larger number of patients in whom the backache is not due to demonstrable bony change. In many of these patients the pain may be poorly localized. Although relief of pain, to a large extent, depends on removal of the cause, the mechanism of response to injury to the back affects the intensity and duration of pain. Therefore, these responses to injury influence treatment of painful injuries of the low back.

Treatment of low back pain has a twofold aim: to relieve the pain in the area of initial trauma and to relieve the muscle spasm and its concomitant effects. For the relief of muscle pain, heat is one of the best analgesics. All types of heat are useful to relieve deep pain or muscle spasm. Short wave diathermy probably is in general preference today because of its efficacy and ease of administration. However, it is my experience that woolen hot packs, heated in boiling water, centrifuged nearly dry and then quickly applied, are the most effective method of relieving muscle spasm. These packs feel extremely hot since they are applied at a temperature of about 80 C., but because of their low water content there is too little heat to blister the skin. After the application of heat, massage is used to increase the threshold for pain and to obtain greater relaxation. Frequently, nodules may be palpated at the sites of tenderness, which disappear with massage. Whether these nodules are local areas of muscle spasm or connective tissue is difficult to determine, but as they are massaged away the tenderness diminishes. Massage is begun gently and increased in pressure gradually as the patient's tolerance increases. When massage is used in this manner, it is pleasant as well as beneficial.

Neither heat nor massage is able to stretch muscles out to their full resting length. Therefore, these forms of treatment are followed by passive or active stretching exercises to increase suppleness. Stretching exercises must be vigorous and must be designed to stretch the muscles which have been held in a shortened position. The muscles most frequently involved in backaches are the erector spinae and the extensors, abductors and flexors of the hips. However, any muscles may be involved in the individual case. Movement of these muscles through the range from full contraction to complete relaxation prevents the development of connective tissue which would tie the muscle fibers down with fibrous contractures and perhaps lead to a permanent deformity.

Acute lumbar strain or acute myofascitis usually is the result of lifting. Immobilization of an acute muscle strain allows development of fibrosis and prolongs the condition. As Bankart stated concisely, "Immobilization of acute back strain turns it into a chronic one. Immobilization of a chronic back strain perpetuates it indefinitely." Therefore, treatment consists of heat and massage for analgesia and relaxation and stretching to mobilize the involved muscles as just described.

All patients with backache should be advised concerning the type of bed to use. The modern bed with a soft innerspring mattress aggravates backaches. It is the observation of many patients with chronic backache that they can sleep better on the floor than on a soft bed. Patients with backache should be advised to sleep on a felt or hair mattress placed on bed boards without a spring. This provides the flatness and support needed to allow the muscles of the back to relax during sleep. Many patients find relief from a chronic backache merely by substituting a firm flat bed for the modern flexible bed.

Book Reviews

Medicine and Science in Postage Stamps. *By W. J. Bishop, F.L.A., Librarian, Wellcome Historical Medical Museum and N. M. Matheson, F.R.C.S., Surgeon, Ashford County Hospital, Middlesex. Boards. Price, 7s. 6d. Pp. 82, with illustrations. Harvey & Blythe, Ltd., 6 Hanover Square, London, W. 1; distributed in the United States by J. J. Boris, 1776 Broadway, New York 19, 1948.*

Until comparatively recent times stamps of medical and scientific interest were few but within the last twenty years they have been issued in large numbers. The number of stamps coming within the field of medicine and science is sufficient to give hope to the most ardent collector.

The contents of this little book are somewhat as follows: Medicine and Science in Postage Stamps; Medical Portrait Stamps; Truants from Medicine; Scientists, Philately of the Red Cross; Tuberculosis Stamps; Maternity and Child Welfare; Hospitals and Other Medical Institutions; Medical Symbolism, and Other Stamps of Medical Interest.

Conditioned Reflexes and Neuron Organization. *By Jerzy Konorski, Head of the Department of Neurophysiology in the Nencki Institute of Experimental Biology and Professor in the University of Lodz. Translated from the Polish MS. Under the Author's Supervision by Stephan Garry. Cambridge Biological Studies. General Editor: C. H. Waddington. Cloth. Price, $4. Pp. 267, with 18 illustrations. Cambridge, at the University Press, The Macmillan Company, 60 Fifth Avenue, New York 11, 1948.*

This book tries to provide a neurophysiological basis for the theory of conditioned reflexes. It is written by one of Pavlov's students and the ideas expressed are those of Professor Pavlov. Much of modern criticism of these theories has been omitted.

A book like this naturally suffers from our lack of knowledge of some of the basic processes of nerve function. It is, for instance, not clearly known what the mechanism of central inhibition is and considerable argument at present surrounds the mechanism of the so-called excitatory state. The author places great stress on the development of synaptic connections during the process of building up of a conditioned reflex. Here again, neurophysiological evidence of this is by no means satisfactory.

With this in mind, the book is a most useful contribution to clarification of ideas about conditioned reflexes. At the present time, when conditioned reflexes are more and more being used as a method of development of muscle function, this book will give a very valuable contribution towards the understanding of the mechanism of conditioned reflexes.

The Back and Its Disorders. *By Philip Lewin, M. D., F.A.C.S., Professor of Bone and Joint Surgery, Northwestern University Medical School. Foreword by Morris Fishbein, M. D. Cloth. Price, $2.75. Pp. 157, with illustrations. McGraw-Hill Book Co., 330 W. 42nd St., New York 18, 1948.*

This book is written for the guidance of the general public rather than for physicians, nurses, physical therapists and occupational therapists. However, this book is not intended to, nor will it, prepare anyone to diagnose or treat his own case or that of another. It tells about the anatomy or physiology of the back as an integral part of that greatest of all machines—the human body.

Almost anyone has misconceptions regarding the functions, dysfunctions and disorders of the back. No other part of the body offers more interesting problems, partly because disorders of the back lend themselves to precise diagnosis, localization and treatment and partly because they are so common. Problems of the back in the army were the most serious of all during the basic training period in the army. They are equally common and serious in industry and business.

Readers will find out why backache is such a widespread medical problem, and they will learn about the latest methods of treatment. Perhaps most important, they will discover some of the simple procedures that they themselves can follow to reduce their chances of developing disorders of the back.

The patient must seek medical advice promptly when symptoms appear. The close cooperation of various specialists with orthopedic surgeons has added much information to the diagnosis of troubles related to the back.

Health Education: A Guide for Teachers and a Text for Teacher Education. *Edited by Charles C. Wilson, M.D., Professor of Education and Public Health, Yale University, New Haven, Connecticut. Revision Committee: Thurman B. Rice, M.D., Bernice Moss, Ed. D., W. W. Bauer, M. D. Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association with the cooperation of contributions and consultants. Fourth edition. Cloth. Price, $3. Pp. 413, with illustrations. National Education Association of the U. S., 1201 16th St. N. W., Washington 6, D.C., 1948.*

The Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association is happy to present to the teachers of the United States this new edition of "Health Education." This publication represents the best modern day philosophy, subject matter and methods in health education so far as the Committee and its many consultants and contributors interpret them.

This book is to acquaint the reader with completely modern viewpoints concerning responsibilities and opportunities in health education. Health problems of the nation are described and interpreted, particularly those which affect children and methods are presented by which these problems can be solved through the cooperation of various community groups.

Emphasis is placed on how children's knowledge and attitudes can be influenced by living healthfully at school and by contacts with the physician and nurse who participate in school health service. Effective methods for organizing health instruction at the elementary and secondary school levels as well as suggestions concerning health education in colleges and for adults are described in detail. Practical ideas are presented concerning the use of audio-visual aids to vitalize and humanize health education and concerning ways of locating and using available resources.

This book is of value to teachers, school physicians, dentists, nurses, school administrators and school patrons.

On the Contributions of Hugh Owen Thomas of Liverpool, Sir Robert Jones of Liverpool and London, John Ridlon, M.D., of New York and Chicago to Modern Orthopedic Surgery. *By H. Winnett Orr, M.D., Chief Surgeon, Nebraska Orthopedic Hospital, Lincoln, Nebraska. With a Supplement on Ridlon and His Share in Moulding Orthopedic Surgery by Arthur Steindler, M.D., Professor, Orthopedic Surgery, University of Iowa Medical School, Iowa City. Cloth. Price, $4.50. Pp. 253, with illustrations. Charles C Thomas, 301-327 E. Lawrence Ave., Springfield, Ill. 1949.*

It has been said: "There can be no doubt that Ridlon understood and applied the Thomas apparatus more efficiently than most of his contemporaries." Orr, the author, said: "Modern orthopedic surgery has been influenced to a considerable degree by the splints and the fundamental teachings of Hugh Owen Thomas. But Thomas influence has been much less than it should have been for these reasons:

"(1) Thomas' writings were not easily read or understood. They were never indexed, and they are long out of print—but they are classics or even masterpieces of orthopedic surgery.

"(2) Thomas' teachings, while they have provided us, in the words of Sir Robert Jones, with an 'orthopedic conscience' have been imperfectly preserved and transmitted to us even by his most loyal pupils—Dr. John Ridlon and Sir Robert Jones.

"(3) The fundamental factor of rest as a therapeutic agent has never been understood or applied by anyone (no exceptions) as well as by Hugh Owen Thomas and—contrary to many supposed authorities—no one else has been as judicious as to the employment of operative surgery, when necessary, or the resumption of function when recovered as Thomas."

The author includes concise and accurate biographies of these three men and relates interesting and entertaining episodes in their lives as he presents the methods and procedures of these forerunners of modern orthopedic surgery. This book is of special interest to orthopedists and to the physical therapists who are working for them.

Introduction to Physiological and Pathological Chemistry. *By S. Earle Arnow. Third Edition. Price, $4. C. V. Mosby Co., 3207 Washington Blvd., St. Louis 3, Mo., 1949.*

This textbook, which is written primarily for student nurses, is divided into three parts. Part I, "Introduction to Chemical Science," contains thirteen chapters, twelve of which are devoted to inorganic chemistry and to the discussion of such topics as metric system, chemical and physical changes, atomic theory, chemical reactions, oxygen, valence, solutions, ionization and oxidation-reduction. The thirteenth chapter is given to the discussion of such topics in organic chemistry as will enable a student to obtain a better understanding of physiological chemistry and nutrition. The author also includes in the chapter on organic chemistry a brief discussion of the sulfa drugs and certain of the alkaloids.

The second part, "Physiological and Pathological Chemistry," contains thirteen chapters dealing with the chemistry and metabolism of carbohydrates, proteins and fats, enzymes, mineral and water metabolism, vitamins, hormones, digestion, nutrition and urine. In these chapters the author discusses the chemistry of health and disease. His discussion for the most part is good, especially the chapters on carbohydrate metabolism and vitamins. There are, however, a few points in which his generalization is incomplete and misleading. For example, in the discussion on soaps, saponification is defined as the reaction between a base and a fatty acid. This is only partially true, since saponification in organic chemistry is understood to mean the hydrolysis of a fat or ester in a basic solution so as to produce an alcohol and a salt.

The entire text is very easy to read, and students with only a small amount of chemical knowledge can understand it without too much difficulty. In the preface the author states that he has tried to express principles and concepts in such a clear and concise manner that the average student can read and understand without further explanation. His attempt toward this end has been largely successful, but some of his discussions are incomplete and tend to leave the student with mistaken ideas. In the chapter on "Acids, Bases and Salts," the definition set forth for acid would lead one to believe that any compound containing hydrogen and some radical is an acid. This again is true in part, but needs further qualification.

Part III, "Introduction to Laboratory Chemistry," has 144 experiments well correlated with the text.

The appendix contains a table of atomic weights, a table on the chemical composition of human blood, and a section on stain removal from fabrics.

As a whole the text is good. The physiological portion is much better than the inorganic part. The weakness of the first half of the book appears to be due to the fact that some of the principal concepts are only partially defined.

Plaster of Paris Technic. *By Edwin O. Geckeler, M.D., Professor of Orthopedic Surgery and Chief of the Fracture Service, Hahnemann Medical College and Hospital, Philadelphia; Fellow of the American College of Surgeons, Fellow of the American Academy of Orthopedic Surgeons, Fellow of the American Association for the Surgery of Trauma, Diplomate of the American Board of Orthopedic Surgery. Second edition. Cloth. Price, $3. Pp. 220, with 236 illustrations. The Williams and Wilkins Company, Mt. Royal and Guilford Aves., Baltimore 2, Md., 1948.*

This is the second edition of this popular book. In this edition, text and figure legends have been revised and brought up-to-date. The illustrations have in many places been rearranged in more convenient sequence. New illustrations have been added and several of the old ones replaced—in all there are twenty of these.

Infra-Red Irradiation. *By William Beaumont, M.R.C.S., L.R.C.P., Director of Physical Medicine, Westminster Hospital, London; Director, Institute of Ray Therapy; Examiner, Chartered Society of Physiotherapy. With a foreword by Lord Horder, G.C.V.O., M.D., F.R.C.P. Third edition. Cloth. Price, 8s. 6d. Pp. 161, with 32 illustrations. H. K. Lewis & Co., Ltd., 136 Gower St., London, W. C. 1, 1948.*

The first chapter on terminology is vital in its conception and admirably achieved, so Lord Horder says in his foreword. Through a brief but lucid account of the physics and physiology of this subject the author passes to the apparatus. The author does not include American apparatus, nor does he mention the work done by the Council on Physical Medicine of the American Medical Association in investigating apparatus.

The other chapters on Technic, Treatment of Common Symptoms, Application to Disease, Combined Treatments, and Record and Analysis of Cases demonstrate the author's fitness to deal with this subject.

Meet Our New Contributors

Harvey, Willie Rebecca, 1st Lieutenant, W.M.S.C., Station Hospital, Fort George G. Meade, Md. Lieutenant Harvey received her B.S. degree in 1934 from Boston University College of Physical Education for Women: Sargent College; took graduate study in Health and Physical Education at the University of Wisconsin, Summer 1939, and the University of North Carolina, Summer 1942. Her physical therapy certificate was received in July 1945 from the Lawson General Hospital, Atlanta, Ga. From 1934 to 1937 she served as Director of Women's Physical Education and Instructor in Hygiene and Physiology, Lynchburg College, Lynchburg, Va.; from 1937 to 1943 as Head of Physical Education Department and Instructor in Hygiene, Saint Mary's School and Junior College, Raleigh, N. C., and in 1945-1946 served as physical therapist at McGuire General Hospital, Richmond, Va. Member: American Physical Therapy Association, American Registry of Physical Therapy Technicians.

Moore, Margaret Lee, 1466 Olive St., Denver, Colo. Miss Moore received her B.S. from Madison College, Harrisonburg, Va., in 1942; her Certificate of Physical Therapy from Walter Reed General Hospital in 1943, and her M.S. in Physical Therapy from Medical College of Virginia, Richmond, in 1948. She served as a physical therapist in the Army, with the rank of Captain, 1944-46, and served as Instructor in the School of Physical Therapy at O'Reilly General Hospital, Springfield, Mo. In 1946-47 she served as research assistant, Baruch Center of Physical Medicine, Medical College of Virginia; from 1947-48 as Instructor in Physical Medicine (Physical Therapy) at the University of Wisconsin, and is now Assistant Technical Director, School of Physical Therapy, University of Colorado Medical Center, Denver, Colo. Member: American Physical Therapy Association, American Registry of Physical Therapy Technicians.

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Suite: parlor and twin with bath	**15.00; 20.00; 25.00**

Please circle type of room and rate desired. If a room at the rate requested is not available, one at the next highest rate will be reserved.

ARRIVAL: Date _____ Time _____ DEPARTURE: Date _____ Time _____

NAME: _____

STREET: _____

CITY: _____ STATE: _____

All reservations will be confirmed. Reservations will be held until 6:00 P.M. unless hotel is notified of late arrival.

BANQUET RESERVATION BLANK

MISS MARGARET AREY
55 QUEENSBERRY STREET
BOSTON 15, MASS.

Name _____

Address _____

Please indicate the alumni group with which you wish to sit _____

Check one of the following: Check for $5 enclosed _____

I will pay when I register* _____

*If you are not registering before Tuesday, June 21st, it will be necessary for you to enclose your check with the Reservation Blank.

BOSTON POPS RESERVATION BLANK

MISS ANN McKINNON
212 NORFOLK STREET
CAMBRIDGE, MASS.

Please reserve _____ tickets for the Pops, June 23rd, 1949.

Please check one of the following:

Table _____ $2.25 Balcony _____ $1.75; _____ $1.25

Signed: Name _____

Address _____

Chapter Directory

Alabama Chapter
President, Bernice K. Carr, 325 41st St., Fairfield, Ala.
Secretary, Mrs. Jo Ann Burroughs, 231 North 78th St., Apt. 3, Birmingham, Ala.

Arizona Chapter
President, Mrs. Florence Collier, 1902 E. 3rd St., Tucson, Ariz.
Secretary, Leone Crosby, Tucson Senior H. S., 2nd Ave. and 6th St., Tucson, Ariz.

Arkansas Chapter
President, Gladys E. Post, Rivercliff Apts., Magnolia St., Little Rock, Ark.
Secretary, Geraldine Larson, 1406 Lincoln Ave., Little Rock, Ark.

Carolina Chapter
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Secretary, Lelia R. Zernow, Box 606, Black Mountain, N. C.

Central New York Chapter
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Secretary, Elvira Hoffmire, 332 Primrose Ave., Syracuse 5, N. Y.

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Secretary, Adeline Doing, Colorado General Hosp., Denver, Colo.

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Secretary, Sophia Radlow, 2975 Chicago Blvd., Apt. 215, Detroit 6, Mich.

Eastern Missouri Chapter
President, Miriam Rodenberger, 1676 N. 36th St., East St. Louis, Ill.
Secretary, Mary C. Safris, U. S. Marine Hosp., Kirkwood, Mo.

Eastern New York Chapter
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